

ALL-TIME GREATS

**A
Collector's
Item**

SCIENCE FICTION CLASSICS

JOHN W. CAMPBELL, JR.

When the Atoms Failed

DAVID H. KELLER, M.D.

Service First

MILES J. BREUER, M.D.

The Gostak and the Doshes

OTIS ADELBERT KLINE

The Man from the Moon

H. HYATT VERRILL

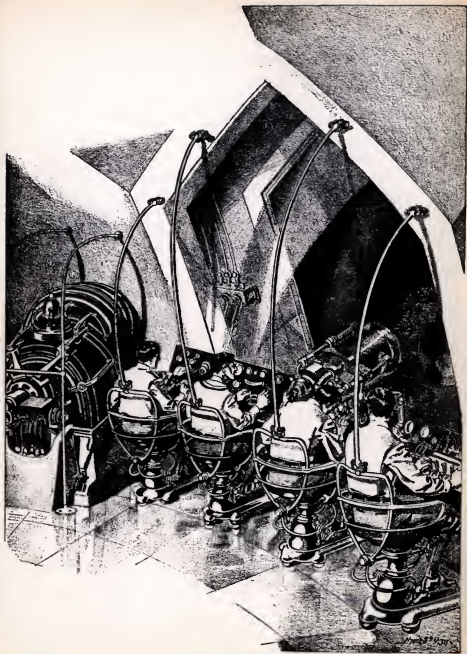
Beyond the Planetoids

EDWIN K. SLOAT

The Astounding Discoveries of Doctor Mentirpso

SCIENCE FICTION CLASSICS NO. 2 • FALL • 1967





SCIENCE FICTION CLASSICS

No. 2
Fall

NOVELETS

WHEN THE ATOMS FAILED, JOHN W. CAMPBELL, JR.	4
THE ASTOUNDING DISCOVERIES OF DOCTOR MENTIROSO H. HYATT VERRILL	35
THE MAN FROM THE MOON, OTIS ADELBERT KLINE	60
BEYOND THE PLANETOIDS, EDWIN K. SLOAT	80
THE GOSTAK AND THE DOSHES, MILES J. BREUER, M.D. ...	96
SERVICE FIRST, DAVID H. KELLER, M.D.	110

FEATURES

THE UNIVERSE WRECKERS ILLUSTRATED BY WESSO	COVERS 2,3,4
---	--------------

● Cover by WESSO
"WHEN THE ATOMS FAILED"

JACK LESTER, Editor and Publisher
RALPH ADRIIS, Managing Editor

HENRY ROBERTS, Associate Editor
FRANK JONES, Art Director

SCIENCE FICTION CLASSICS, is published quarterly by Magazine Productions, 69-62 230 Street Bayside, Long Island, N.Y. at 50¢ a copy. Subscription rates: One Year (4 issues) U.S. and possessions: \$1.65; Canada and Pan American Union Countries \$2.00; all other countries \$2.50. Copyright 1967 by Magazine Productions. Copyright 1926, 1928 by E.P. Co. Inc., Copyright 1931, 1932 by Teck Pub. Co. All rights reserved.

WHEN THE ATOMS FAILED

JOHN W. CAMPBELL, JR.

Illustrated by WESSO

The Martians were coming and man seemed ripe for the plucking until a "lone wolf" genius and his meagre staff put their heads together and combining sheer "guts" with some "cookbook" physics turn the invaders aside in a memorable battle in space.



Copyright 1929 by E. P. Co. Inc.

Science Fiction Classics

Author's Foreword

When the events of which I am to tell took place all the world was interested only in their final outcome, but when that last awful day was ended, and time enough had passed to give our world a chance to find a way to apply and use the awful forces it had had forced upon it, or, indeed, had even found how to control their immense energies, men began to wonder about the true story of the Invasion.

I had always been a writer, first newspaper work, then a book or two. Perhaps because of this the world expected that an account would soon be presented. But had those millions seen that awful battle, seen those mighty wrecks on the hot sands, even then might they understand my dread of telling of that titanic defeat in a conflict in which the weaker was a million times more powerful than any force man had previously seen! It still burns in my memory, that awful scene in its desolate setting—the vast rolling desert below, seared, blasted, fused in great streaks where the intense, stabbing heat rays had cut it, mighty craters blasted in its surface where the terrific explosions of the shells had heaved thousands of tons of sand into great mounds, and those ghastly wrecks that lay crushed and broken on the hot sands below, bathed in the ruddy light of the sun of sunset, now slowly sinking behind the distant purple hills, as the last of the Invaders crashed on the packed sands below.

Two men of all Earth's billions saw that scene—but those two will never forget—as Stephen Waterson and I can testify.

Ten years have passed, ten years of stupendous change, readjustment, and

cosmic conquest. Ten years in which a world has been added to man's domain, yet still sharp and clear in my memory is the picture of those shapeless masses, those lumps of glowing metal, that lay on the sands beneath us, the sole vestiges of the mighty ships of Mars.

Never have I wanted to think long on that scene of titanic destruction, destruction such as man never before knew, but friends have convinced me that it is my duty as one who lived in closest contact with the facts, and one of the two men who saw that last struggle, to tell the story as it unrolled itself before me.

Brief it is. The entire event, for all its consequences, lasted but two days—days that changed the history of a Universe!

But in this march of mighty events, I was but a spectator, and as a spectator I shall tell it. And I shall try to depict for you the character of the greatest man of all the System's history—Stephen Waterson.

Waterson Laboratories

May, 1957

David Gale.

IT was late afternoon in May, 1947, and the temperature had climbed to unbelievable heights during the day. It seemed impossible to work with that merciless sun beating down on the roof. It is odd that a temperature of 95° in May should seem far higher than a similar temperature in July. On the top floors of the great apartments it was stifling. The great disadvantage of roof landings for planes had always been the tendency of the roofs to absorb heat in summer, yet on the topmost floors of those apart-

ments people were living, and in one of those apartments a man was trying to work. Heat was a great trouble, but he found thoughts of hunger in the not too distant future an even greater inspiration to work. The manuscript he was correcting was lengthy, but this was the final revision, which was some comfort. Still the low buzz of the telephone annunciator was a relief. It was so much easier to talk. He took up the telephone.

"Gale speaking."

"Hello Dave, this is Steve. I hear you are having a bit of hot weather in New York today. I have a suggestion for you—I'm coming to pick you up in an hour and a half, and if you will be ready on your roof then, in a camp suit, and with camp clothes for about a monthpacked, I can guarantee you some fun, providing, of course, that you're still the man I knew. But I can't guarantee to return you! Meet me on your roof in an hour and a half."

"Well, I'll—now what's up? So he isn't sure I'll get back—and he calls that a 'suggestion'! Anyhow it sounds interesting and I'll have to hurry. I wish he'd get into the habit of warning a fellow when he is going to start one of his expeditions! And I may not come back—I wonder where on Earth he's going now—and where he was then. The only reason he gives me an hour and a half is because it will take him that long to get here. He would drop in on me without any notice otherwise. In that case he must be about three hundred miles from here. But where?"

An hour and a half later he was on the roof, watching the darting planes, there were a good many, but by far

the larger part of the world's business and pleasure was on the ground in those days. Still the crimson and gray special of Waterson's ought to be easily visible. He was late—unusual for Steve. Gale hadn't seen him in more than a year—probably been working on one of his eternal experiments, he decided.

Still he searched the skies in vain. Only the regular planes, and one dirigible—tiny in the distance—it seemed to be coming toward him—and it certainly was coming rapidly—it couldn't be a dirigible—no gas bag could go that fast—then he saw the crimson and the gray band around it—it was Steve.

And now as it darted down and landed gracefully on the roof beside him, he saw that the machine was but thirty-five feet long, and ten or so in diameter. Suddenly a small round hatchway opened in its curved, windowless side of polished metal, and a moment later Stephen Waterson forced his way out. The door was certainly small, and forcing that six-foot-two body in and out through it must have been a feat worthy of a magician. Gale noticed that he would just about fit it, but the giant Waterson must have intended to use it very infrequently to make it that size.

"Hello, Dave—how do you like my new boat? But get in, we're going. There, your bag's in already."

"Good Lord, Steve, what is this? I gather you invented it. Certainly I never saw nor heard of it before," said Gale.

"Well, Dave, I suppose you might say I invented it, but the truth is that a machine invented it—or at least discovered the principles on which it is based."

"A machine! A machine invented it? What do you mean? A machine can't think, can it?"

"I'm not so sure they can't, Dave, but get in—I'll tell you later. I promised Wright I would be back in three hours, and I've lost ten minutes already. Also, this machine weighs three thousand tons—so I don't want to leave it on this roof longer than is absolutely necessary."

"But, Steve—let me look at it. Man, it is beautiful. What is that metal?"

"Try the inside, Dave—there!"

Dave Gale was rather good sized—five feet ten, and weighing over one hundred and sixty pounds, but Waterson was in perfect physical condition, two hundred and ten pounds of solid muscle, and Gale had been popped into the hatch like a bag of meal, so quickly was it done.

Now he turned to look at the tiny room in which he found himself. It was evidently the pilot room, and around the front of the room there ran a clear window, curved to fit the curve of the ship's walls, and about three feet high, the center coming at about the level of the eye of a person sitting in either of the two deeply cushioned chairs directly facing it. The chairs were evidently an integral part of the machine, and from the heavy straps attached to them it was obvious that the passengers were expected to need some support. The arms of each chair were fully two feet broad, and many small instruments and controls were arranged on their polished black surfaces. Waterson had seated himself in the right hand chair and strapped himself in. Gale hastened to secure himself in the left chair.

"Take it easy Dave, and be pre-

pared for a shock when we start."

"I'm ready Steve, let's go!"

Waterson moved his right hand a bit, and a tiny red bulb showed on his left instrument panel; many of his instruments began to give readings and several on Gale's board did so also. Another movement, and there was a muffled hum of an air blower. Then Waterson looked at Gale and turned a small venier dial—Gale had been watching intently—but suddenly the look left his face—and was replaced by a look of astonished pain. The entire car had suddenly jerked a bit, then that peculiarly unpleasant sensation connected most intimately with a rapid elevator or helicopter starting from rest had made itself unpleasantly pronounced. Gale's pained and somewhat sick expression caused Waterson's smile to broaden.

"Whew—Steve—what is this—why don't you warn a fellow of what's coming!"

"I did warn you, Dave," answered Waterson, "and if you will look out, I think you will understand this."

The car was rising, at first slowly, but ever faster and faster, from the roof, not as a helicopter rises, not as a dirigible rises, but more as a heavy body falls, with high acceleration ever faster and faster. Soon it was rising quite rapidly, straight up. Then another tiny red bulb flashed into life on Waterson's switchboard, and the ship suddenly tilted at an angle of thirty degrees. Then it shot forward, and continually accelerated an already great speed, till New York lay far behind, and then the sky became dark and black, and now the stars were looking in at them, not the winking, blue stars of Earth, but the blazing, steady

stars of infinite space, and they were of every color, dull reds, greenish, and blue. And now as they shot on across the face of Earth far below, Gale watched in rapture the magnificent view before him, seeking the old friends of Earth—Mars, Venus, Jupiter, and the other familiar, gleaming points. Then he turned his gaze toward the Sun, and cried out in astonishment, for the giant sphere was a hard, electric blue, like some monster electric arc, and for millions of miles there swept from it a great hazy, glowing cloud, the zodiacal light, almost invisible from Earth, but here blazing out in indescribable beauty.

"We're in space! But, Steve, look at the sun! What makes it look blue? The glass of the window isn't blue, is it?" said Gale excitedly.

"We're in space all right—but it isn't glass you're looking through; it is fused quartz. Glass that thick would crack in a moment under the stress of temperature change it has to undergo. The sun looks blue because, for the first time in your life, you are seeing it without having more than half its light screened off. The atmosphere won't pass blue light completely and it cuts off the ultra-violet transmission very shortly after we leave the visible region of the spectrum. The reason the sun has always looked yellow is that you could never see that blue portion of its spectrum. Remember, a thing gets bluer and bluer as it gets hotter. First we have red hot, bright red, yellow, white, then the electric arc is so hot that it gives blue light. But the sun is nearly two thousand degrees centigrade hotter than the electric arc. Naturally it is blue. Also, I'll bet you haven't found Mars.

"No, Steve, I haven't. Where is it?"

"Right over there. See it?"

"But that can't be Mars. It's green, green as the Earth."

"But it is Mars. The reason Mars looks red from Earth is that the light that reaches us from Mars has had to go through both its own atmosphere and through ours, and by the time it reaches us, it is reddened, just as a distant plane beacon is. You know how a light in the distance looks red. That is what makes Mars look red."

"Mars is green. Then it is possible that the life on Mars may be the same as that of Earth!"

"Right, Dave. It probably is. Remember that the chlorophyll that gives the planets their color is also the material that can convert sunlight energy into fixed energy of starches and sugars for the plant, and probably the same material is serving in that capacity all over the universe, for carbon is the only element of the more than a hundred that there are that can possibly permit life's infinitely complicated processes to progress."

"But I thought there were only ninety-two elements."

"There are ninety-two different types of atoms, but if you have half a dozen men all doing exactly the same thing, can you call them 'a man'? They have found more than six different kinds of lead, two different kinds of chlorine, several different kinds of argon, and many of the other elements are really averages of several kinds of atoms, all of which do exactly the same thing, but have different weights. They are called isotopes. We say the atomic weight of chlorine is 35.457, but really there is no atom that has that weight. They have weights

of 35 and 37, and are jumbled together so that the average is 35.457. Really there are over a hundred different kinds of atoms. In my work on this ship I found it made quite a difference which kind of chlorine atom I had."

"Well, how does this machine work, and what do you mean by saying that a machine invented it?"

"Dave, you know that for a number of years the greatest advances in physics have been made along the lines of mathematical work in atomic structure. Einstein was the greatest of the mathematicians, and so the greatest of the atomicists. Now, as you well know, I never was too good at mathematics but I did love atomic structure, and I had some ideas, but I needed someone to work out the mathematics of the theory for me.

"You remember that back in 1929 in the Massachusetts Institute of Technology they had a machine they called the integraph, an electrical machine that could do calculus too complex for Einstein himself to work out, and problems it would take Einstein months to solve, the machine could solve in a few minutes. It could actually do mathematics beyond the scope of the human brain. The calculus is a wonderful tool with which man can dig out knowledge, but he has to keep making his shovel bigger and bigger to dig deeper and deeper into the field of science. Toward the end of this decade, things got so the tail was wagging the dog to a considerable extent, the shovel was bigger than the man—we couldn't handle the tool. When that happened in the world once before they made a still bigger shovel, and hitched it to an electric

motor. All the integraph did was to hitch the calculus to an electric motor—and then things began to happen.

"I developed that machine further in my laboratory, and carried it far beyond the original plans. I can do with it a type of mathematics that was never before possible, and that mathematics, on that machine, had done something no man ever did. It has found the secret of the atom, and released for us atomic energy. But that wasn't all, the machine kept working at those great long equations, reducing the number of variables, changing, differentiating, integrating, and then I saw where it was leading! I was scared when I saw what those equations meant. I was afraid that the machine had made an error, I was deathly afraid to test that last equation, the equation which the machine was absolutely unable to change. *It had been working with the equations of matter, and now it had reached the ultimate, definitive equation of all matter!* This final equation gave explicit instructions to the understanding; it told just how to *completely destroy matter!* It told how to release such terrific energy, I was afraid to try it. The equations of atomic energy I had tested and found good, I had succeeded in releasing the energy of atoms.

"But the energy of matter has been known for many years; simple arithmetic can calculate the energy in one gram of matter. One gram is the equivalent of about ten drops of water and that much matter contains 900,000,000,000,000,000 ergs of energy, all this in ten drops of water! Mass is just as truly a measure of energy as ergs, as foot-pounds or as kilowatt hours. You might buy your

electricity by the pound. If you had five hundred million dollars or so, you could buy a pound. You have heard of atomic energy, of how terrifically powerful it is. It is just about one million times as great as the energy of coal. But that titanic energy is as little compared to the energy of matter itself, as the strength of an ant is compared to my strength. Material energy is ten thousand million times as great as the energy of coal. Perhaps now you can see why I was afraid to try out those equations. One gram of matter could explode as violently as seven thousand tons of dynamite!

"But the machine was right. I succeeded in releasing that awful energy. I happened to release it as a heat ray, and the apparatus had been pointed in the direction of an open window luckily. Beyond that was just sand. The window was volatilized instantly, and the sand was melted to a great mass of fused quartz. It is there, and will be there for centuries, a two-mile streak of melted sand fifty feet broad! It makes a wonderful road of six foot thick glass—The machine showed me a thousand ways to apply it. I am driving this ship by means of an interesting bit of apparatus that the calculating machine designed. You remember Einstein's general relativity theory said that mass, gravity, bent space; but as it didn't fall in, as it would if attracted and not resisting, it must be that it is elastic. The field theory that he brought out back in 1929 showed that gravity and electrostatic fields were at least similar. I found, with the aid of my machine, that they were very closely related. I charge the walls of my ship strongly negative, then I have a piece of ap-

paratus here that will distort that electrostatic field so it cuts off gravity—and the ship has no weight. The propulsion is simple also. I told you that space was elastic. I have a projector, or series of projectors all around the ship which will throw a beam of a ray which tends to bend space toward it. The space resists, and since the mountain won't come to Mahomet, Mahomet goes to the mountain—and the ship sails along nicely.

"The only theoretical limit to my speed is, of course, the velocity of light. At that speed any body would have infinite mass, and as you can't produce an infinite force, you certainly can't go any faster, and you can't go that fast in fact. If I accelerated one of the little five gram bullets I use in that machine gun to the speed of an alpha particle such as radium shoots off, not a very high speed in space, it would require as much energy to get it up to that speed, 10,000 miles a second, as five thousand fast freights, each a thousand tons apiece, would require to get up a speed of a mile a minute. You see that there is no possibility of getting up any speed like that even with material energy—it is too expensive even with that cheap energy—for it costs just as much to slow down again!

"The interesting thing about this energy is that scientists have known about it for a good many years, and while hundreds of people told about atomic energy, no one outside of the scientists ever spoke of the far greater energy of matter. The scientists said that the sun used that energy to maintain its heat—forty million degrees on the interior of the sun. They said

man could never duplicate that temperature nor that pressure that prevails at the interior of the sun. They therefore said that man would never be able to release that energy. But the sun had to raise thousands of tons of water, and blow that vapor many miles, and do a lot of other complicated things before there was any lightning. Man would never be able to reproduce those conditions, and he would never be able to make lightning. Besides, if he did, what good would his electricity do him; it would be so wild, and so useless.

"But man discovered other ways of releasing his energies and converting it into electricity in a way that did not exist in nature. Manifestly it is possible to do the same with the energy of matter, and I have done it.

"The object of this trip, Dave, is exploration. I am going to the other planets, and I want you to come along. I believe I am prepared for any trouble we may meet there. That machine gun shoots bullets loaded with a bit of matter that will explode on impact. There is only a dust grain of it there, but it is as violent as ten tons of dynamite. If I exploded the entire shell, remember I would get the equivalent of thirty-five thousand tons of dynamite—which is manifestly unsafe. There are also a series of projectors around the car that project heat rays. These rays are capable of volatilizing anything that will absorb them. The projectors of all the rays have a separate generator unit directly connected. The unit is built right into the projector, but controlled from here. They are small, but tremendously more powerful than any power plant the Earth has ever seen before—each one

can far outdo the great million and a half horsepower station in San Francisco. They can develop in the neighborhood of fifty million horsepower each!"

"Lord, Steve, I'm no scientist, and when you speak glibly of power sources millions, billions of times more powerful than coal, I'm not only lost, I'm scared. And you have a couple of dozen of those fifty-million-horsepower-generators around this ship. What would happen if they got short-circuited or something?"

"If they did, which I don't believe they will, they would either explode the entire ship, and incidentally make the Earth at least stagger in its orbit, or fuse it instantaneously and so destroy themselves. I might add that we would not survive the calamity."

"No, I rather guessed that. But, Steve, here in the utter cold and utter vacuum of space I should think that it would be hard to heat the ship. How do you do it?"

"The first thing to do in any explanation is to point out that space is neither empty nor cold. In the second place, a vacuum couldn't be either hot or cold. Temperature is a condition of matter, and if there is no matter, there can be no temperature. But space is quite full—about one atom per cubic inch. There is so much matter between us and the fixed stars that we can actually detect the spectrum of space superposed on the spectrum of the star. The light that the stars send us across the intervening spaces comes to us laden with a message of the contents of space—and tells of millions of tons of calcium and sodium. Even the tiny volume of our solar system contains in its free space about 125,000,000,000

grams of matter. That doesn't mean much to an astronomer—but when you remember that every gram of that can furnish as much energy as 10,000, 000,000 grams of coal, we see that it isn't so little! And as space does have matter, it can have a temperature, and does. It has a temperature of about 15,000 degrees. Most of the atoms of that space have escaped from the surface of stars and have a temperature about the same as that of the surface of the stars. So you see that space—utterly cold—is hotter than anything on Earth! The only difficulty is that it takes a whale of a lot of space to contain enough atoms to weigh a gram, and so the average concentration of heat is so low that we can say that space is cold. Similarly a block of ice may contain far more heat than a piece of red-hot iron. Nevertheless, I would prefer to sit on the ice."

"Quite so, I see your point, and I believe I'd prefer the ice myself. But that's interesting! Space isn't empty, it's not cold, in fact it's unusually hot!"

"Now we've started this let's finish it, Dave. It is hot, but not unusually hot—if anything it is unusually cold! The usual, or average temperature of all the matter in the universe is about one million degrees, so space at 15,000 is really far below the average, and so we can say that it is unusually cold. The temperature of the interior of the stars is uniformly forty million degrees, which brings the average up. But it is the unthinkable great quantities of matter in interstellar space that brings the average down. Remember that the nearest star is four and a half light years from us, and between the stars there is such a vast space in which the matter is thinly distributed

that the few pinpoint concentrations of matter have to be extremely hot if they are to bring the average up any appreciable amount. But here and there in this vast space there are a few tiny bits of matter that have cooled down to terrifically frigid temperatures—temperatures within a few degrees of absolute zero, only two or three hundred degrees above; spots of matter so cold that hydrogen and oxygen can unite; so cold that this compound can even condense to a liquid; so cold that life can exist. We call those pinpoints planets.

"In the interstellar range of temperatures we have everywhere from absolute zero to forty million above. Life can exist between the temperatures absolute, of about two hundred and three hundred and twenty—a range of one hundred degrees in a range of forty million. That means that the temperature of this planet must be maintained with an allowable inaccuracy of one part in four hundred thousand! Do you see what the chances of a planet's having a 'habitable' temperature are?

"But we are near my laboratory now, Dave, and I want to introduce you to Wright, my laboratory assistant, a brilliant student, and an uncannily clever artisan. He made Bartholemew, as I call the mathematics machine, and most of the parts of this ship. He had heat rays to work with, and had iridium metal as his material, and plenty of any element. He had a fine time working out the best alloy, and the best treatment. The shell of the car is made of an alloy of tungsten, iridium and cobalt. It is exceedingly tough, very strong, and very hard. It will scratch glass,

is stronger than steel, and is as ductile and malleable as copper—if you have sufficient force. Iridium used to sell for about 250 dollars an ounce, but these powers allow me to transmute it, which renders it cheap for me. After this, sodium metal will be cheaper than sodium compounds!”

“I wish that that trip had not been so short, Steve. There were a lot of things I wanted to ask you. Where are we now? I don’t seem to recognize this country.”

“We are over Arizona—see there is the laboratory now—off there.”

“What, Arizona! How fast were we going?”

“We were going slowly, considering we were in space, but considering our proximity to the Earth we were going rapidly. The actual speed is difficult to determine—remember we had cut loose all ties of gravity, and I had to follow the Earth in its orbit, and the whole solar system along through space. From here to New York City is about three thousand miles, and as we made the trip in just under one hundred minutes, we traveled at a speed of thirty miles a minute, or half a mile a second.”

“Well, the airplane speed record was about four hundred and twenty, wasn’t it—I mean an hour—you have to specify now! You set a new record I guess!”

They were sailing down through the atmosphere toward the distant low building that had seen the construction of that first of Earth’s space cruisers. The long gentle glide slowly flattened out and the car at last glided slowly, gently through the open hangar doors. Wright was there to greet them, but Waterson called out that he would

stay in the ship a few minutes to show Gale around.

“Steve, you sure picked a desolate place to work in. Why did you go way out here?”

“For two reasons. First I wanted a place that was quiet; and second I wanted a place where I could safely work with atomic energy—where explosions, premeditated or accidental, would not blow up an entire city. Did you notice that crater off to one side as we came in? That is where I tried out my first bullet. I hadn’t gotten a small enough charge in it. I had nearly a milligram—a hundredth of a drop of water. But come, I guess you saw the pilot room. I’ll show you how to run the ship tomorrow.”

He led the way to the rear end of the pilot room, where a small door opened in the smooth, windowless metal partition. It too gleamed with that strangely iridescent beauty of metallic iridium.

“This bunk room should appeal to an apartment house addict. I had about eleven feet I could use to make it, and it is just a bit crowded.”

Considering Waterson’s six-feet-two, a room eleven feet long, ten feet high, and about as wide, would certainly be crowded if there was anything or anyone else in the room. As the bunk room was also dining room, galley, and chart room, it was decidedly crowded. One thing that particularly interested Gale was a small screen on which were a series of small lights, projected from the rear.

“What is that, Steve?” he inquired.

“That is my chart. It is the only kind of chart you could well expect on board a space ship. The lights are really moving and maintain the rela-

tive positions of the planets. I think we will go to Mars first, because it is now as close as it will be for some time. I want to go to Venus soon, but that is on the other side of the sun. I will find that there are detours even in space when I go there!"

"That's quite a chart! I suppose you have more accurate ones too?"

"No, I have no need of more accurate ones. I start for my objective, and it is so big I can't miss it!"

"That's true too! But I haven't seen any apparatus for taking care of your air. I suspect that door over there hides something."

"It does. It leads to the store room and the apparatus room. There are all the tools I carry, the air purifier and water renewer. Remember that the break-up of the atomic energy gives me unlimited amounts of electricity, so I have all the electric power I can use. I find that there is a way to electrolyse carbon dioxide to carbon and oxygen. In this manner I recover the oxygen for the air—at least part of the necessary oxygen—and at the same time remove the menace of the CO₂. There is considerable oxygen fixed as H₂O, however, so I installed an electrolyser to take care of that. The moisture of the air is in this way kept down to a comfortable maximum. The same apparatus is useful for reducing the water. All the water I have I must carry in tanks, which require space. I am able to make them considerably smaller by taking the water, passing it through this electrolyser, reducing it to hydrogen and oxygen, burning them to water again, and thus getting pure H₂O. The one difficulty is in getting rid of the heat. Remember that all the heat I lost I

must lose by radiation. But the sun is radiating to me. I receive heat at exactly the same rate the Earth does and I have no protective atmosphere, so the tendency is to reach a super-tropical temperature. The easiest solution of this problem is to go with the ship at such an angle to the sun that the shadow of the exposed surface shades the greater portion of the ship, then by adjusting the angle of the ship, I can adjust the ratio of radiating to receiving area to any value I wish, and get almost any temperature I need."

"That is an idea. I never heard of electrolysing carbon dioxide, though. Tell me—how do you do it?"

"That is a process I developed. It requires considerable explaining. However, I am doubtful whether it wouldn't have been easier to convert the stuff directly to oxygen by transmutation."

"Steve, I notice you have plenty of light, but why not have windows?"

"I have no windows except in the main pilot room. The trouble with windows is that they reduce the strength of the shell. Also, as this is a sleeping room, and there will be no night in space, why not have it this way? I need considerable strength in the walls of the ship, because the accelerations that I use in starting and turning and stopping are really rather a strain on any material. The outer wall is a six-inch iridio-tungsten alloy shell, with two openings in it, the window, and the door. The rest is absolutely seamless, one solid casting. The window is so designed, in connection with the placement of the ray projectors that it doesn't weaken the shell. There is no framework, but the two partitions across the ship

are each six inches thick, and act as braces. The inner wall is a thin one-inch layer of metal, supported by the outer shell, and separated from it by small braces about two inches high. This intervening space has been evacuated by the simple process of going out into space and opening a valve, then closing it before returning to Earth."

"That one-inch layer of metal of yours is bothering me. There is something strange about it, and all the trim and mouldings in here. The green I suppose is to relieve eye strain, but it is not the color itself that seems strange. It is the impression I have that the metal itself is of that beautiful leaf green shade, and that it is the metal in the chairs, table, and racks that gives them that color."

"Quite right Dave, it is."

"But Steve, I thought that there were no more elements to be discovered. In the collection at the Museum in New York they had all ninety-two, and I saw no colored metals."

"In the first place, remember I told you there really were more than ninety-two elements, and I don't believe they had all the ninety-two there, for there are several elements that disintegrate inside of a few days. They couldn't keep those. But these metals are compounds."

"Compounds! Do you mean alloys?"

"No, chemical compounds, just as truly as salt or sulphuric acid. They are related to tetra-ethyl-stibine, $Sb(C_2H_5)_4$, which is a compound that acts like a metal physically and chemically. It is too soft to be any good, but there are hundreds of these organic compounds of carbon. There are

red ones, green ones, blue ones, and a thousand different ones, soft, brittle, liquid, solid; some are even gaseous."

"Colored metals! What a boon to artists! Think what fun they will have working in that stuff!"

"Yes, but it is also useful for decorative purposes, although the large molecule makes it too soft to be used as a wearing surface."

"Well Steve, you sure have a mighty fine little ship! What do you call it? You said that you called the mathematics machine 'Bartholemew.' What do you call this?"

"As yet it has not been named. I wanted you to suggest some name for it."

"That's a sudden order, Steve. What have you thought of?"

"Well, I thought of calling it fluorine, for the chemical element which is so active that it cannot be displaced by any other, but will, on the other hand force any other non-metal out of its compound. Then I thought of Nina, the name of Columbus' ship which first touched a new world, and Wright reminded me that Eric, the Red's son Lief landed here in about 1000 and suggested Eric as a name."

"Well, that's a good assortment. Why pick on me?"

"We thought you ought to be good at inventing names, since you had written several books."

"That is a fine excuse! I get mine from old magazines! But I might suggest 'The Electron.' It sounds well, and I remember that you said that you charged it negatively to cut out the gravity of the Earth and an electron—or is it a proton that has a negative charge?"

"‘The Electron’—sounds good—and the idea is good. An electron has a negative charge. Wright also suggested the ‘Terrestrial,’ as it would be the first ship of Earth to visit other worlds. It is between ‘Electron’ and ‘Terrestrial’ now. Which do you like better?"

"I prefer ‘Terrestrial.’ It has more meaning."

"Well, we'll tell Wright about it. In the meantime, come into the laboratory and meet Bartholemew."

Bartholemew was at the moment engaged in tracing a very complicated curve, the integral of a half dozen or so other curves. Wright was carefully watching the thin line left by the pencil. There was a low steady humming coming from the machine, and a bank of small transformers on the other side of the room connected to it. Wright turned off the machine as they entered, and after greeting Waterson and meeting Gale, proceeded at once with an enthusiastic description of the machine. He was obviously proud of the machine, and of the man who had developed it. The entire machine had been enclosed in a metal case when Gale entered, but now Wright opened this, and Gale was decidedly surprised to see the interior. He really had had no reason to form any opinion of the machine, but he had expected a maze of gears, shafts, levers, chains and every sort of mechanical apparatus. Somehow the mention of a machine for doing mathematics conveyed to him that impression. The actual machine seemed quite simple—merely a small cable leading from the separate "graph interpreters," as Wright called them, to the central integrator, and hence a small motor carried the integrated result into

practice and put it on paper strips.

This machine made possible a type of mathematics hitherto unknown. This new calculus was to the previous integration what integration was to addition. Integration is an infinite summation of very small terms, and this new mathematics was an integration in an infinite number of dimensions. The beginner first learns to integrate in two dimensions. Then come three. Einstein had carried his mathematics to four. The machine seemed to work in an infinite number of dimensions, but the conditions of the problem really chose the four out of infinity that were under discussion. An infinite number of dimensions has no physical meaning. It might be put this way, Wright said: there are an infinite number of solutions to the equation $x = 2 + y$, and as such it has no meaning. But if for example you say also that $2y = x$, then auto-mathematically you choose two of an infinite number of values that fit the problem in hand. A man might have done all this machine did, had he lived long enough and been patient enough. This machine could do in an hour a problem that would have taken a man a lifetime. Thus it had been able to develop the true mathematical picture of the atom.

Over the supper table that night they had a final discussion as to the name of the ship. It was decided that the name should be "Terrestrial," and plans were made to christen it in as scientific a manner as possible. Considering that the shell was made of iridium, and therefore highly inert to chemical action, they decided on a bottle of aqua regia which dissolves gold and platinum, and does not attack iridium. A bottle was prepared,

and they were ready for the chirstening in the morning. Just as they decided to call the day done, the telephone rang. It was Dr. Wilkins of Mt. Wilson calling Waterson. The conversation was rather lengthy, and Wright, who had answered, told Gale that Dr. Wilkins had called before, about two months ago, on a question in astro-physics, and Waterson had been able to give the answer. This time however, Dr. Wilkins, it seemed, was greatly agitated. Just then Waterson returned.

"Gale, it seems we chose our name well. Also I am lucky in having you here. I must go to Mt. Wilson at once, I'll be back about dawn, and I'll tell you two all about it then. I've got to hurry. So long."

A moment later the two men heard the hum of the motor as the hangar doors were opened. Another moment and the entire countryside was flooded with a blaze of bluish white light, that illuminated the desolate dry desert for miles, and for all those weary miles it was an unending, rolling surface of sand. In the glow of sudden light, great strange shadows which started up by the buildings gave weird effects on the sand, but with it all there was a rugged and compelling beauty to the little world which the light had cut from the darkness. There was a sudden whistle of air, and the light faded as the car shot off toward Mt. Wilson.

"What a mass of sand there is around here! It would seem almost like a dried up ocean bed," said Gale.

"I suppose there is a lot of sand in the world—there should be though, it is the direct compound of the two most abundant elements on Earth, silicon and oxygen."

"Wright, I've often wondered why it is that oxygen, which combines with almost anything, should be found free in nature. Why is it?"

"I dont know, I'm sure. At that I suppose one reason is that there is so much of it. Just a very small fraction less than half of the Earth's surface layers is oxygen. It forms over forty-nine percent of it to a depth of ten miles at least. It is the second most active element on Earth—in the universe for that matter, and of the active elements there is only one with which it can't combine, namely, fluorine. Of course it can't combine with the inert gases, so I say the active elements. I suppose it is left free principally because there was nothing else to do. Apparently there weren't enough partners to go around. At that it did a mighty good job of it! Forty-seven per cent of the solid crust is oxygen, 85% of the water is oxygen, and 20% of the air is free oxygen. Well, let's not look so favorable a gift horse in the mouth. If it hadn't been left free, where would we be?"

The discussion soon died down and the men retired for the night, each wondering what it was that had called Waterson away so suddenly, and each determined to be on hand when he returned in the morning.

The coming of the light of dawn had, perforce, put an end to the activities at Mt. Wilson, so it was shortly after sunrise that the two men heard the hangar doors open. And it was very shortly after sunrise that they had dressed and gone down to greet Waterson. The worried look on his face told a great deal, for both men knew him well, and when Waterson looked worried there was something of tre-

mendous import under way.

"Hello. Had a good night Dave? I have something that is going to interest you—and two and a half billion other human beings. They have discovered something at the Mt. Wilson observatory that is going to change our plans quite a bit. We had intended going to other planets to visit the inhabitants, but we won't have to go. They are coming to us; furthermore, twenty ships are coming, and I have an idea they are good sized ships. But Wright, I think you had better start breakfast. We can discuss it at the table. I'm going to wash, and if you will help Wright, Dave, I think we will be at work pretty soon." Waterson left the room, and the two men looked at his retreating figure with astonishment and wonder. An announcement that our planet was to be invaded from space is a bit hard to take in all at once, and particularly when it is given in the matter of fact way that Waterson had presented it, for he had known it now for over ten hours, and had been working on it during all that time.

At the table the explanation was resumed:

"The ships were first sighted in the big telescope when they turned it toward Mars last night. You remember that Mars is at its closest now, and they saw these spots of light on the disc of Mars they were at once excited and started immediate spectroscopic and radiometric observations. The fact that they showed against the disc of Mars meant that they were nearer than the planet, and by measuring the amount of energy coming from them they tried to calculate their size. The results at once proved that they could not be light because of reflec-

tion, for the energy that they emitted would require a surface of visible dimensions, and these were points. Their temperature was too low to be incandescent, so they were violating all the laws of astro-physics. By this time they had shifted sufficiently to make some estimate of their distance, shifted because of the movement of the Earth in its orbit, Dave, and so they were covering a different spot on the disc of Mars. Allowing that they were going in a straight line, the were some ten and a half million miles away. The spectroscope showed by displacement of one of the spectral lines that they were coming toward us at about 100 miles a second. The line of their flight was such that they would intercept the Earth in its orbit in about thirty hours. That means that we have about twenty to work in.

"It doesn't take any alarmist to guess that this means trouble. They would not be coming in twenty ships if they were coming on a peaceful mission. Also considering that they come in only twenty ships it shows that they have considerable confidence in those twenty. Since they are coming here without first sending a scouting party of one or two ships, I suspect that they already know that the conditions of Earth are suitable to them. To determine our conditions would require exceedingly powerful telescopes, but they are helped by the thin air of their planet. I believe that they can actually see our machines and weapons, and that they know just about what we have. I think that they are counting on cleaning up the world very easily—as indeed they would but for one factor, for they have atomic energy. Wright, do you remember that we de-

cided to use electronic rockets to drive the car, once we discovered atomic energy? And that having discovered material energy, we naturally decided not to? Well, they have electronic rockets. This makes me feel sure that that means that they have atomic energy, but have no material energy."

"Fine Steve. Your reasoning is most admirable—but will you please translate 'electronic rocket' and a few of those other terms into English? And otherwise make yourself clear to the layman?"

"Well, I suppose I have no right to call a cathode ray tube an electronic rocket, but when a cathode ray tube gets that big it really needs a new name. The idea is the same as that of a rocket. You know the experiments the Germans, the millionaire Opel, and others carried out in 1927 with rocket automobiles? They had a terrible time with their rockets because the heat of one set off the next. The result was a disastrous explosion—and they had a whole ocean of air to cool them! What would a rocket do in free space? Also remember the principle of a rocket is that you shoot particles out of the rear at a very high speed and thus impart the kick to the ship. The electronic rocket does the same thing—but instead of shooting molecules of hot gas, it shoots electrons, a giant cathode ray tube such as Coolidge had in 1927, but his was so small that the kick was immeasurable. Remember that as the velocity of the electrons approaches that of light, the mass increases and so the electrons as shot from a cathode ray rocket may weigh as much as a milligram. The problem of propulsion then is not hard with atomic energy to supply the terrific

voltages needed to run the tube. But the cathode rays are going to be their first weapon. Cathode rays are absorbed by any object they hit, and their terrific energy is converted to heat. They are deadly in themselves, and the heat is of course deadly. They will also have heat rays. I can make a heat ray with atomic energy, though mine is derived from material. The only way we can fight them is to know beforehand what we are to meet. This is to be a war for a world, and the war will be a battle of titanic forces. The weaker of the forces will be a million times greater than anything man has ever known before, and either of these two forces would, if fully applied, blast our planet from its place around the sun! Such forces can not be withstood. They must be annulled, deflected, or annihilated by some greater force. Only when we know what to expect can we fight them and live. Remember, if they once succeeded in getting one weak spot in our armor, we can never have another chance, and the world can never hope to fight them—mere armies and a navy or two, with a couple of air forces thrown in—what would they amount to? The energy of atoms could destroy them like paper in a blowtorch—think what would happen to one of those beautifully absorbing grey battleships if a heat ray touched it! Their eighteen-inch steel armor would not melt—it would boil away! A submarine would be no safer—they could explode the water about it into steam and crush it. The effect of a heat ray in water is just that—the water is converted to steam so suddenly that there is a terrific explosion. The cathode rays could sweep an army out of existence as

hose might wash away an army of mud soldiers. They won't have gases. They will have no use for them. They could wipe a city off the map, leave only a great crater in the scarred Earth, while men were getting ready to lay a gas barrage. A shell would certainly just bounce off of the armor of my ship and I suspect that it would do the same with the Martian ships. Earth has only one weapon that can even bother them! And that one weapon is the one factor in the equation. I have suggested two weapons they will have, the cathode rays and the heat ray. They will, of course, have others; they will have atomic bombs, and I am sure that they will find us so dangerous that they will be willing to lose a ship and crash us. This gives us something else to avoid. Can any of you think of something else?"

"Good Lord Steve, haven't you thought of enough?"

"Plenty, Dave, but it isn't considered good form in military proceedings to permit the enemy to surprise you. In fact, it is highly probable that if he does, you will get a new form, one more adapted to aerial transit."

"Yes, that's true, too. But I remember reading once that ultra-violet light was invisible, and very dangerous to the body. I wonder if they will use that?"

"They may, but I greatly doubt it. Air is very nearly opaque to ultra-violet light, above a certain limit, and below that limit it is not very harmful. The infra-red heat rays, though are going to be a very great menace. I can't think of any way to make them harmless. Of course, the polished iridium shell of the ship will

protect us from the sides, as the heat will all be reflected. The difficulty will be that the heat will fuse the window, and thus attack us. The quartz glass is nearly opaque to heat rays, as is all glass. Being opaque, it absorbs it, 'cuts it out' as we say. The result will be that the glass will melt instantly, whereupon we will go very quickly. The idea of putting a polished metal shutter before the window is one we will have to adopt, but we must modify it somehow. The heat rays will be turned back all right—and so will the light rays. The question is to shut out heat and let in light. Any suggestions?"

"I wonder if there isn't some selective reflector that we could use, Dr. Waterson?"

"That is a good idea, Wright—but I don't know of any that will pass all the light and reflect all the heat!"

"What is a selective reflector, Steve?"

"There are lots of things that have that property Dave, gold leaf is one, it can transmit green light—that is you can see green light through it, but it reflects yellow light—the complement of the green it transmits. There are a great many organic dyes that are one color when you look at them and the complement of that color when you look through them. The trouble is we need one that transmits the visible portion of the spectrum—and boy—that's it, Wright, that's it—spectrum—take a totally reflecting diffraction grating, reflect out all that part of the spectrum that we don't want, take what we do, pass it through a prism to recombine it to white light, then through lenses so we can see as if through a telescope!

"Again it sounds good, but I'd like to hear it in English, Steve."

"The idea is to take a diffraction grating, a piece of metal with, usually 14,438 lines to the inch ruled on it, and previously highly polished, so that it reflects most of the light that hits it. Now it is reflected at different angles, so that we have a spectrum. The spectrum spreads out light and heat waves as well—I use the reflection grating as no material will pass the heat rays, and it then is possible to reflect out of the car again those rays we do not want. The light, which we do want, we will pass through a prism which will recombine it to white light. A prism can either split up light into different colors, or recombine them to white. Lenses then will be needed to make the images clear. The effect will be much the same as a telescope. And that takes care of the heat waves. The cathode rays, luckily won't bother us for the car is already charged strongly negative, and negatively charged electrons will be strongly repelled, as they are in the grid of a vacuum tube, so they will never hit us. The bombs constitute the worst menace. The only defense we have against them is the very doubtful one of not being there when they are. That is a good policy in any case.

"As a last precaution—a bit grim—I will arrange it so that if the 'Terrestrial' is damaged to the point of utter helplessness we can, by pushing a single button, explode the entire car—as material energy. It will utterly destroy everything within a radius of a hundred miles, and damage everything within a much greater radius. I believe it well not be serious enough to change the Earth's orbit, though."

"Good—cheerful man, aren't you, Steve! Now what have we to meet that delightful array?"

"We have things even more delightful. Our heat ray is considerably more powerful, I imagine. It is generated by a force ten thousand times as great. Our bombs will be worse. Wright, I wish you would make about a hundred shells that will explode with the fully thirty-five thousand ton equivalent of dynamite. And then we will have everything they have that is going to be effective, and have it in a more concentrated form. Can any of you suggest anything else?"

"Steve, you said that your car was nearly pure iridium on the outside, and that is very inert. The outside of this ship will be polished too, won't it?"

"Probably—though I don't believe they were expecting to meet a heat ray."

"Well, I wonder if there isn't some chemical you could spray out that would tarnish their ship, without hurting your iridium ship? Then it wouldn't be polished and would absorb your heat rays."

"That's a good idea, Dave. I might use a sulphide—nearly all sulphides are colored, and form very easily and rapidly. Or I might use liquid ozone. That will tarnish almost anything to an oxide, which is also apt to be colored. I could certainly heat the ship that way, but I wonder—I'm afraid that the oxide or sulphide would break down too easily. There is only one metal that they might use on which that would work, namely steel. Iron sulphide is black, stable, and will not decompose readily. The oxide forms readily, is highly colored, and will

not decompose before the metal is incandescent, or even melted. The only difficulty is that steel is so readily attacked, that they wouldn't use it. They would probably coat it with an inert metal, silver for instance. That forms a black sulphide very readily. I'm afraid that won't work Dave. But Wright, I think that it would be a good idea to develop a few of those field theory equations in a different way. Try integrating number two-six-thirty-nine—I think that's it—and between the limits of equation one-four-twenty-three and zero. I have an idea that a little development of that idea will give us a beam that will be very useful. We haven't time to make much apparatus, but I think the result will be near enough to the space curving projector to allow us to change the extra projectors we have in the laboratory to fit. Also, try calculating the arrangement we will need for the heat eliminator, please. I'm going to give Dave his first lesson in space navigation. We'll be back about noon—if at all!" But Gale caught the wink, so the effect was lost.

Ten thousand miles out in free space the practice began. As Waterson pointed out, it would require some mighty poor handling to hit the Earth now. For the first time in Gale's life he could practice with a machine with no fear of hitting anything.

When the ship slanted down in a long graceful glide, to enter the hangar doors that noon, Gale was in control. The controls of the ship were remarkably easy to master and extremely simple. The one thing that was hard to master was the tremendous range of power. It could be changed in a smooth

climb from a fraction of a horsepower to billions! The first attempts had been a bit hard on the passengers, the seat straps coming in for their share of use.

When they returned to the laboratory, they found Wright had just prepared a light lunch, and at once began to demolish it. Six hours between breakfast and lunch is conducive to a husky appetite.

Wright had finished the integration on the machine, and had calculated the mathematics of the heat eliminator in a little less than four hours. The results were very satisfactory, and in the remaining time he had converted six of the extra projectors to their new use, and had them ready for installation. After lunch the men began on the construction of the heat eliminators. Two were to be installed, one for the observer as well as one for the pilot. The heavier work of installing the projectors and the iridium shield was reserved for later in the afternoon.

By six that evening, the new projectors were completely installed and the connections made, and the great iridium shield was cooling from blinding incandescence in its mold. It would be installed that night, but now they felt that a rest and a meal were due them. They had been working under a great strain that afternoon, for they knew that they must get that machine ready before the Martians reached Earth, and there was a great deal to do. After the brief dinner they went out to the shining "Terrestrial." As yet, the new projectors had not been tried.

Gracefully the great shining shell backed out into the ruddy glory of the sinking sun, the red light had turned

desert to a sea of rolling fire, with here and there a wave that showed dark—a mound. In the far distance the purple hills of Nevada seemed like distant islands in this burning sea, and above it rode this lone, shining ship, magnificently iridescent in the setting sun. Now it stopped, hovered, then suddenly a pile of metal ingots that lay to one side of the laboratory leaped into the air and shot toward it—then paused in mid-air, hung poised for an instant, then sank lightly to the ground. Now the sand of the desert began to roll into some strange wave that began just beneath the ship, then sped away—further—till it died in the far distance, by means of an invisible beam. A wall of sand thirty feet high had been built in an instant, and it extended as far as the eye could reach! Now the ship settled, and slowly, light as a feather for all its three thousand tons of metal, it glided into the hanger.

"Man Steve, that works! How long a range has it? And please tell me about it now you are sure it works!"

"I don't know just how long a range it has—it affected the sand as far as we could see, and we were using very little power. It projects a beam of gravity, and theoretically at least it has an infinite range; and it certainly has a whale of a lot of power. I can use a good deal of the power too, for the strain of the attracting is taken off the mountings and the ship, and put on space itself! The gravity projector is double and projects a beam of the gravity ray forward and an equally powerful beam of the space curve behind. The two rays are controlled by the same apparatus, and so are always equal. The result is

that no matter how great a load I put on it, the entire load is expended in trying to bend space!"

That night work was carried on under the floodlighting from the ship's great light projectors. The entire region was illuminated, and work was easy. Waterson had been instructed to take a rest when he seemed bent on continuing his work. Even his great body could not keep up that hard labor forever, and forty-eight hours of work will make any man nervous. With a crisis such as this facing him, he certainly needed rest. He agreed, provided they would call him in two hours. Two hours later Gale walked about a mile from the laboratory and called. He then returned and continued his work on the placement of the shield. It had been placed, polished, and tiny holes bored in it for the heat eliminator inside of four hours. It was operated by an electric motor, controlled from within. It could be lowered and leave the window clear, but when in position its polished surface made it perfectly safe against heat rays. The work had just been completed, when Waterson reappeared looking decidedly ruffled.

"Say, I thought you two promised to call me in two hours! It's been just four, and I woke up myself!"

"But Steve, I did call you and you didn't hear me. I didn't say I'd wake you in two hours."

It was shortly afterwards that news of the coming invasion was made public. And with the news came the wild panics, even mad, licentious outbreaks all over the world. Man saw himself helpless before mighty enemies whom he could not resist. Never had such a complete disruption of business taken place in so short a time. Things were

done that night in a terrible spirit of "we die tomorrow, we play today." The terrible jams in the cities caused deaths of hundreds of thousands. They wanted to flee the cities, get into the woods and hide like some animal. Within an hour no news could reach most of them, and though Waterson had told of his ship, told immediately, given every government official announcements concerning it, still the mad dance went on. But to those that had stayed near the radio sets, this news brought relief. No television pictures of it could be broadcast for many hours, as there was no portable equipment within several hundreds of miles, and the men were working on the ship.

That night the three men took turns watching by the radio set for news. The Martians were due to land somewhere on Earth that morning. It would probably be a temporary landing in some land that was just at dawn. And it was so. But the "Terrestrial" must not be taken by surprise.

Waterson was to have the morning watch. Unlike the others, he did not sit by the radio set. He answered the few messages he received, but the entire four hours of his watch he spent working with Bartholemew. The equations he was working with seemed new, strange, and they had terrific import to the understanding. It was but a few minutes before the Martians landed when he had gotten the final result. At once he called the two others.

"Wright, if that equation means what I think it does, we have something that will give us a tremendous advantage! I feel sure that the Martians have actually worked out the problems to meet them. But as they

may land any minute now, let's begin on this. We need two of these projectors in front, and two at the stern. If you will start on the actual projectors, I'll start the instrument end. Come on Dave."

And so all three heard the announcement that the Martians had landed. Twenty mighty ships had settled down in the arid land of Nevada. The ships were a bare five hundred miles from them! The dry air of the desert was probably best suited for Martian lungs. Army planes had been cruising about all night waiting for the enemy, waiting to learn definitely what they were to face. It was Lt. Charles H. Austin who sighted them. He first saw them while still on the very outskirts of our atmosphere, and reported them at once, turning his television finder on them. Great balls of purple fire they seemed as they sank rapidly through our atmosphere. The great ships floated down and as they came within a mile or so of him, he was able to see that the great flaming globes of light were beneath them, seemingly supporting them. A breeze was blowing from them to him, and the air, even at that distance, was chokingly impregnated with oxides of nitrogen and ozone, from the forty mighty glowing spheres. They were fully an hundred and fifty feet in diameter, but the ships themselves, illuminated by the weird light of the glow of their sister ships, were far greater. Each was three thousand feet long, and two hundred and fifty feet in diameter. Hundreds of thousands of tons those mighty machines must have weighed, and the fiery globes of ionized air that shone under the impact of the cathode rays alone told how they were supported.

Now, two by two they sank, and came to rest on the sands below, and as they came near the ground the glowing ray touched the sand, and for that moment it glowed incandescent, then quickly cooled as the ray was shut off. At last the mighty armada of space had settled on the packed sands, and now there sprang from each a great shaft of light that searched the heavens above for planes. By luck the plane of the observer was missed, and the television set clicked steadily on as the questing beams were reduced to five, and now the ground was flooded with blinding light. A moment later the side of one of the great ships opened, and from it a gangplank thrust itself. Then from it there came a stream of men, but men with great chests, great ears, thin arms and legs; men that must have stood ten feet high. Painfully they scrambled down the plank, toiling under the greater gravity of Earth. But what a thrill must have been theirs! They were the first men of this system to ever have set foot on two planets! And some of those men were to step forth on a third—the first men to visit it too!

Painfully now they were coming from their huge interplanetary cruisers, slowly they plodded across the intervening space to their comrades, pouring from their sister ships.

Then suddenly the television screen was white—a blinding searchlight had at last picked up the plane. Wildly the pilot dived, and now there came a picture of all those men looking upward, their first glimpse of the works of man perhaps. But the beam that had been eluded was reinforced in a moment—then there came a dull

red beam—a flash—and the screen was smoothly dark.

Waterson and his friends feverishly worked at their tasks. There was no doubt about the inimical intentions of the Martians now. They had destroyed a man without reason. And the projectors were rapidly taking shape under the practiced hands of Wright. Dawn broke, and the men stopped for breakfast, but still the work on the projectors was not done. Many parts were so similar to those of the other projectors that they could use the spare projectors for parts, many others were new. It was shortly after breakfast that the news of the Martians' landing came. They had started now on the famous Day of Terror. But still the men in the laboratory worked at their tasks. The "Terrestrial" had been christened according to plan, and was now ready to start at any moment, but the new projectors were an additional weapon—a mighty weapon.

All matter is made of atoms, grouped to form molecules, combinations of atoms, or a molecule may contain but one atom, as is the case of helium. The atoms within the molecule are held to each other by electro-static attraction. The molecules of substances like wood are very large, and hold to each other by a form of gravity between the molecules. These are called amorphous substances. Water is a liquid, a typical liquid, but we have many things that we do not recognize as liquids. Asphalt may be so cold that it will scarcely run, yet we can say it is a liquid. Glass is a liquid. It is a liquid that has cooled till it became so viscous it could not run. Glass is not crystalline, but after very many

years it does slowly crystallize. The molecules of a liquid are held together by a gravitational attraction for each other. But in crystals we have a curious condition. The atoms of salt, sodium chloride, do not pair off one sodium and one chlorine atom when they crystallize; perhaps a million sodium atoms go with a million chlorine atoms, and give a crystal of sodium chloride. Thus we have that a crystal is not $n(\text{NaCl})$ but it is Na_nCl_n . Thus a crystal of salt is one giant molecule. This means then that the crystal is held together by electrostatic forces and not gravitational forces. The magnitude of these forces is such that if equivalent weights of sodium and chlorine atoms could be separated and placed at the poles, the chlorine atoms at the north and, eight thousand miles to the south, the sodium, over all the distance the twenty-three pounds of sodium would attract the thirty-five pounds of chlorine atoms with a force of forty tons!

So it is that in all crystals the atoms are mutually balancing, and balanced by perhaps a dozen others. The electrostatic forces hold the crystals together, and the crystals then hold together by gravity in many cases; otherwise they don't hold together at all. A block of steel is made of billions of tiny crystals, each attracting its neighbor, and thus are held together. But this force is a gravitational force.

Now what would happen if the force of gravity between these crystals were annihilated? Instantly the piece of metal would cease to have any strength; it would fall to a heap of ultra-microscopic crystals, a mere heap of impalpably fine dust! The strongest metal would break down to nothing!

Such was the ray that Waterson had developed. It would throw a beam of a force that would thus annul the force of gravity, and the projector had been made of a single crystal of quartz. Its effects could be predicted, and it would indeed be a deadly weapon! The hardest metals fell to a fine powder before it. Wood, flesh, liquids, any amorphous or liquid substance was thrown off as single molecules. It would cause water to burst into vapor spontaneously, without heat, for when there is no attraction between the molecules, water is naturally a gas. Only crystals defied this disintegration ray, and only crystals could be used in working with it.

But while the men in the lonely laboratory in Arizona were finishing the most terrible of their weapons, the Martians were going down the Pacific coast.

When morning dawned on our world, it found a wild and restless aggregation of men fleeing wildly from every large city, and with dawn came the news that the Martian armada had risen, taking all its ships, and was heading westward. Straight across Nevada they sailed in awful grandeur, the mighty globes of blazing cathode rays bright even in the light of the sun.

Across the eastern part of California, and with an accuracy that told of carefully drawn maps, they went directly to the largest city of the West Coast, San Francisco. There they hung, high in air, their mighty glowing spheres a magnificent sight, motionless, like some mighty menace that hangs, ever ready to fall in terrible doom on the victim beneath. For perhaps an hour they hung thus, motion-

less, then there dropped from them the first of the atomic bombs. Tiny they were. No man saw them fall; only the effects were visible, and they were visible as a mighty chasm yawned in sudden eruption where solid earth had been before. One landed in the Golden Gate. After that it looked as a child's dam might look—a wall of mud and pebbles. But pictures and newsreels of the destruction of that city tell far more than any wordy description can. Once it had been destroyed by earthquake and fire, and had been built up again, but no phenomenon of Nature could be so terrible as was that destruction. Now it was being pulverized by titanic explosions, fused by mighty heat rays, and disintegrated by the awful force of the cathode rays. We can think only of that chaos of slashing, searing heat rays, the burning violet of pencil-like cathode rays, and the frightful explosions of the atomic bombs. It took them just sixteen minutes to destroy that city, as no city has been destroyed in all the history of the Earth. Only the spot in desert Nevada where the last battle was fought was to be more frightfully torn. But in all that city of the dead there was none of the suffering that had accompanied the other destruction; there were none to suffer; it was complete, instantaneous. Death itself is kind, but the way to death is thorny, and only those who pass quickly, as did these, find it a happy passing.

And then for perhaps a half hour more the great ships hung high above the still glowing ruins, supported on those blazing globes of ionized air. Then suddenly the entire fleet in perfect formation, turned and glided majestically southward. The thousands of

people of Los Angeles went mad when this news reached them. All seemed bent on escaping from the city at the same time, and many escaped by death. It took the Martians twelve minutes to reach Los Angeles, and then the mighty shadows of their hulls were spread over the packed streets, over the thousands of people that struggled to leave.

But the Martians did not destroy that city. For two hours they hung motionless above, then glided slowly on.

All that day they hung over the state of California, moving from point to point with such apparently definite intention, it seemed they must be investigating some already known land. No more damage did they do unless they were molested. But wherever a gun spoke, a stabbing beam of heat reached down, caressed the spot, and left only a smoking, glowing pit of molten rock. A bombing plane that had climbed high in anticipation of their coming landed a great bomb directly on the back of one of the great ships. The explosion caused the mighty machine to stagger, but the tough wall was merely dented. An instant later there was a second explosion as the remaining bombs and the gasoline of the plane were set off by a pencil of glowing cathode rays. But when no resistance was offered, the Martian fleet soared smoothly overhead, oblivious of man, till at last they turned and started once more for the landing place in Nevada.

The last work on the projectors had been finished by noon that day, and they were installed in the ship immediately. Then came the test.

Again the "Terrestrial" floated

lightly in the air outside the hangar, and again the pile of ingots leaped into the air to hang motionless, suspended by the gravity beam. Then came another beam, a beam of pale violet light that reached down to touch the bars with a caressing bath of violet radiance—a moment they glowed thus, then their hard outlines seemed to soften, to melt away, as still glowing, they expanded, grew larger. Inside of ten seconds the ingots of tungsten, each weighing over two hundred pounds, were gone. They had gone as a vapor of individual crystals; so gone that no eye could see them! The ray was a complete success, and now as the "Terrestrial" returned to its place under Waterson's skilful guidance, the men felt a new confidence in their weapon! The projectors of the disintegration ray had not yet been fitted with the polished iridium shields, and without these they would be vulnerable to heat rays.

It was during the installation of these that the accident happened. Wright had already put the left front projector shield in place, and was beginning on the right, but the small ladder from which he worked rested against the polished iridium surface of the car, and as this was rounded, he did not have a very secure perch. The shield weighed close to a hundred pounds, for iridium is the heaviest known metal, and it was constructed of inch-thick plates. While trying to swing one of these heavy shields into place, the changed direction of the force on the ladder caused it to slip, and a moment later Wright had fallen to the floor.

The heavy shield had landed beneath him, and his weight falling on top,

had broken his right arm. Wright would be unable to operate any of the mechanism of the "Terrestrial," which required all eyes, arms and legs to work successfully. While Waterson installed the remaining shields, Gale hurried Wright to the nearest town in Waterson's monoplane.

It was three-thirty by the time he returned, and Waterson had mounted the shields. His great strength and size made the task far easier for him, and the work had been completed, and the shields finally polished, and welded in place.

The entire afternoon the radio had been bringing constant reports of the progress of the Martians. As they were doing no damage now, and were over a densely populated district, where any battle such as would result should the "Terrestrial" attack them would surely destroy a considerable amount of valuable property, Waterson decided to wait till they had left California. To the west was the ocean, and a conflict there would do no damage. To the east was the desert, and to the south was the sparsely settled regions of low property value. Only to the north would the value of the property be prohibitive to a final encounter.

When, at about five, news came that the Martians were returning to the desert landing spot in Nevada, Waterson at once set out to intercept them, and as his tiny car was prepared and waiting, the Martian armada came in sight, at first mere glistening points far off across the purple desert hills, but approaching hundreds of miles an hour.

Yet it seemed hours while those glowing points neared, grew and be-

came giant ships, though still miles away. When at last the leader of the Martian fleet came within about a half mile of its tiny oponent, without slowing its rapid flight, there sprang from its nose a glowing violet beam that reached out like a glowing finger of death to touch the machine ahead.

But that machine was strongly charged with a tremendous negative potential,

And now the "Terrestrial" went into action, retreating before the bull-like rush of its mighty opponents. The twenty great ships were drawn up in a perfect line formation, a semicircle, that each might be able to use its weapons with the greatest effect without interfering with its neighbor. Now from the gleaming ship ahead there sprang out a dull red beam, a beam that reached out to touch and caress the advancing ships. Six mighty ships it touched, and those six mighty ships continued their bull rush without control, spreading consternation in the ordered rank, for in each the pilot room had instantly become a mass of flame and glowing metal under the influence of the heat ray. The other fourteen ships had swerved at once, diving wildly lest that beam of red death reach them, but three great hulks dived, and in a dive that ended in flaming wreckage on the packed sands, ten miles below. The other three ships that had felt that deadly ray regained control before touching the earth, but those three that went down, mighty cathode rays streaming, struck and formed great craters in the sand.

But again that ray of death stabbed out, for one Martian had incautiously exposed his control room, and in an instant it too was diving. The

mighty ray tubes forcing it on, it plunged headlong, with ever greater velocity to the packed sands below. An instant later there was a titanic concussion, an explosion that made the mighty Martians rock, and stagger drunkenly as the blast of air rushed up, and a great crater, a full half mile across, yawned in the earth's surface. Every atomic bomb in that ship had gone off!

The three ships that had been rayed retreated now, and left thirteen active ships to attack the "Terrestrial." The shield had been placed long before, and now as the Martians concentrated their heat rays on the glistening point before them, it was unaffected. While they were practically blind, they could not risk an exposure to that heat ray.

"Steve, I thought that heat ray was entirely cut out by the heat eliminator. How is it I could see your beam?"

"Yqu can't see heat anyhow—and it does cut out all the infra-red rays. The reason you can see that beam is that I send a bit of red light with it so I can aim it."

Again the Martians had drawn up into a semicircle, with the "Terrestrial" at the centre, and now there suddenly appeared at the bow of each a flash of violet light. At the same instant the ship before them shot straight up with a terrific acceleration—and it was well it did! Almost immediately there was an explosion that made even the gargantuan Martian ships reel, though they were over ten miles from the spot where the explosion occurred.

"Nice—they use a potassium salt in their explosive, Dave. See the purple color of the cannon flame?"

"Yes, but why not use the atomic

energy to drive the shells as well as to explode them?"

"They couldn't make a cannon stand that explosion—but move—he's trying to crash us."

The Martians seemed intent on ramming the tiny ship that floated so unperturbed before them. Now three great ships were coming at them. Suddenly there was a sharp rattle of the machine gun, then as that stopped, the "Terrestrial" shot away, backed away from the Martians at a terrific speed. Gale had never seen the explosive bullets work, and now when the three leading Martian ships seemed suddenly, quietly, to leap into a thousand ragged pieces, giant masses of metal that flew off from the ruptured ship at terrific speed, and with force that made them crash through the thick walls of their sister ship, it seemed magic. Those great ships seemed irresistible. Then suddenly they flew into a thousand great pieces. But all was quiet. No mighty concussion sounded. Only the slight flash of light as the ships split open. Titanic ships had been there—a deadly menace that came crashing down at them—then they were not there! And more, another ship had been crushed by a great flying piece of metal. Only the fact that these three had been well in front of the rest had saved the main part of the Martian fleet. The atomic generators of the one ship must have been utterly destroyed, for the great, glowing spheres of ionized air that showed the cathode rays to be working, had died, and the great ship was settling, still on an even keel, held upright by the gyroscopes that stabiliz-

ed it, but falling, falling ever faster and faster to the earth, over twelve miles below.

"Steve—did—did I do that? Why didn't I hear the explosion?"

"You sure did, Dave, and made a fine job of it—three hits out of three shots—in fact four hits with three shots. The sound of the explosion can travel through air, but we are in free space."

But nine ships still remained active of the original twenty of the Martian Armada, and these nine seemed bent on an immediate end to this battle. This tiny thing was deadly! Deadly beyond their wildest dreams—if it continued to operate, they wouldn't—it must be destroyed.

Again they attacked, but now the cathode rays were streaming before them, a great shield of flaming blue light. Again the thin red beam of death reached out, caressed the ships—and the pilot room became a mass of flames. But they had learned that the ships were controlled from some other part; they were coming smoothly on! Again came the sputtering pop of the machine gun. But it, too, seemed useless—the mighty explosions occurred far from their goal—the cathode rays were setting off the shells. And now one of the nine left the rank and shot at the "Terrestrial" with a sudden burst of speed. On it came at a terrific speed—one mile—three quarters—a half—

Then there came a new ray from the bow of the tiny glistening ship. It seemed a tiny cathode ray, as it glowed blue in the ionized air, but, like the ship, it was strangely an

iridescent violet—and as it touched the hurtling Martian, the great ship glowed violet, the color seemed to spread and flow over it, then it stopped. The ship was no longer glowing—and the strange ray ceased. But where the titanic, hurtling ship had been a moment before, was a slight clouding—and a few solid specks—small—the ship was utterly destroyed!

The other Martians withdrew. Here was something they could not understand. Heat they knew—explosions they knew—but this dissolution of a titanic ship—thousands of tons of matter—and in a fraction of a second—it was new; it seemed incredible.

But now again they formed themselves—this time they made a mighty cube, the eight ships, each at one corner—and five miles on a side the mighty cube advanced, till the "Terrestrial" formed a center to it. Now the great ships slowly closed in—but still the glistening ship remained in the center. There was plenty of room to escape—then suddenly, as the cube contracted to a three mile side, it moved. Instantly there came from all the great ships around it, a low but tremendously powerful hum—such a hum as one could hear around a power sub-station in the old days—the hum of transformers—and the tiny ship suddenly stopped—then reversed, shot back to the center of that mighty cube, and hung there! Now swiftly the cube was contracting—and still the tiny car hung there! It was jerking—but it moved only a few hundred feet each time—then suddenly it started—went faster—faster—then

there was a distinct jar as it slowed down—almost reversed—but again it continued. At last it shot outside the wall of that cube and shot away with a terrific acceleration.

"Whew—Dave, they almost got us that time! That was a stunt I had never thought of—though I can see how it is done. They have tremendously powerful alternating current magnets on each of those ships. This car is non-magnetic, but a conductor, so there are induced in it powerful currents. You notice how hot it has grown in here—you can scarcely breathe—they induced terrific currents in our outer as well as in our inner shell. The result was that we were repelled from the powerful magnets. They were placed at the corners of a cube, so the only place that we could stay in equilibrium was in the exact center. When I tried to escape, I had to go nearer one of the poles, and the repelling force became greater. Then the ships on the far side shut off their magnets, so that they no longer repelled me—and I started to fall back—but I was able to pull out. The terrific acceleration I got just after leaving the cube was due to the repulsion of their magnets. You see it was very sizable! Had I had atomic energy only, I would never have gotten out of that field of force. I can, because of my material energy, escape every time. See—they are going to try again—let them—when they get close, we can turn on the disintegration ray and pick off the top ships. Then the bottom ships!"

Again the "Terrestrial" was held in that titanic field of force—that field

was so great that all magnetic compasses all over the Earth were deflected, and the currents induced in the telephone lines, telegraph lines, power transformers and all other apparatus were so great that many lines in the vicinity were melted. The cube contracted to a mile dimension before the glowing, iridescent ray of death reached out to dissolve that first ship—then a second—a third—a fourth—and the Martians were in the wildest confusion—the cathode rays prevented the “Terrestrial’s” bombs from striking, but it also made their own projectiles useless. They had been sent to conquer this new planet for their race—and they were failing. They could not rush that tiny ship—for the deadly disintegration ray would only destroy the ship before they had had a chance to crash into the “Terrestrial.” It seemed hopeless, but they tried once more.

Now from every side the ships of the Martians came at their tiny opponent, mighty hurtling hulks of hundreds of thousands of tons—it seemed they must get that tiny ship—there seemed no opening. The three damaged ships had joined in this last attempt—and as the seven gargantuan ships charged down at the “Terrestrial,” there sprang from it again the pale beam of disintegration—and one of the four remaining undamaged ships ceased to exist. The gap was closed—another ship was gone—and a third flashed into nothingness as the tiny opponent swung that deadly beam—then it was free—and turning to meet the four remaining Martians.

But now they turned—and started

up—up—up. They were leaving Earth! And now, as the blazing sun sank below the far horizon of distant purple hills, one faltered, the burning violet spheres went dark, and it plunged faster and faster into the darkness below—down from the glowing light of the ruddy sun into the deep shadow far below—down to the shadow of Death—for the damaged generators had failed. And as that last great ship crashed on the far sands, the violet globes of light of the others were dying in the rare air far from Earth. The Martians had come, had seen and had been conquered.

“Steve—they are going—we have won. This planet is ours now—man has proven it. But they may bring reinforcements—are you going to let them go?”

“No, Dave, I have one more thing I want to do. I want to give an object lesson.”

The tiny ship set off in the wake of the defeated giants—faster and faster. It was overhauling them—and at last it did—just beyond the orbit of the Moon. The undamaged ship was leading the train of four ships as they went back. Their world must have been watching—must have seen that battle—must have known. And now they were returning.

As the tiny ship came up to them the Martians turned at bay it seemed—and waited. Then from the tiny ship before them there came a new ray—invisible here in space—but a ray that caught and pulled the great ship it touched—the undamaged ship. In an instant it was falling toward the “Ter-

restrian"—then its great cathode tubes were turned on—invisible here in space also. Now it stopped, started away—but greater and greater became the force on it. It was a colossal tug of war! The giant seemed an easy victor—but the giant had the forces of atoms—and the smaller had the energy of matter to drive against it. It was a battle of Titanic forces; with space itself the battleground, and the great ship of the Martians was pulling, not against the small ship, but against space itself, for the equalizing space distorting apparatus took all tension from the "Terrestrial" itself. The great cathode ray tubes were working at full power now, yet still, inexorably, the Martian was following the "Terrestrial!" Faster they were going now—accelerating—despite the mighty cathode rays of the Martians!

Of that awful trip through space and the terrible moments we had in the depths of space, you know. At times it seemed we must annihilate our giant prisoner, but always Waterson's skillful dodging avoided the bull rushes of the Martian. He would strain back with all available tubes, then suddenly turn all his force the other way—try to crash into us. It was a terrible trip—but toward the end he had decided to follow—and came smoothly. The strain of expecting some treachery kept us in suspense. Two weeks that long trip to Venus took. Two of the most awful weeks of my life. But two weeks in which I learned to marvel at that ship—learned to wonder at the terrific and constantly changing tugs it received—terrific yanks to avoid the hurtling

tons of the Martian. I thought it must surely weaken under that continued strain, but it held. We had to get whatever sleep we could in the chairs. No food could be cooked, the sudden jerks threw us in all directions when we least expected it—but at last we reached the hot, steaming planet. Glad I was to see it, too!

The "Terrestrial" left its giant prisoner there, and as it rose through the hot, moist air it rose in a blaze of glowing color, for every available projector on its tiny surface had been turned on as a light projector—it was a beautiful salute as we left, red, blue, orange, green—every color of the spectrum blazed as a great, glowing finger of colored light in the misty air.

It took us but three days to return—Waterson admitted he went at a rate that was really unsafe—he had to put in another charge in the fuel distributor—water—and it held nearly a pint, too.

When at last we reached Arizona again, Wright was there to greet us—and so were delegates of every nation. It was supposed to be a welcoming committee, but every one of the delegates had something to say about why the secret of material energy should really be given to his country.

Waterson refused to give out the secret of that energy though. He demanded that the nations scrape every instrument of war, and then meet in the first Terrestrial Congress and write laws that might apply material energy to the ends of man, not to the ending of man!

It seems strange, the persistence with which the governments of the world held fast to those old battleships and

guns! They were hopelessly useless now, yet they would not agree to that term of the agreement! It required Waterson's famous ultimatum to bring action.

"To the Governments of the Earth:

"For centuries and millenniums man has had wars. One reason has been that he has had the tools of war. The tools of war are going to be abolished now. Every armored cruiser, battleship, destroyer, submarine, aircraft carrier and all other types of war craft will be taken to the nearest port, and every gun, cannon or other weapon of more than one mile range loaded on those ships. They will then be taken to the nearest ocean, and sank in water of a depth of at least one mile.

"In the first place the weapons would be useless. The ship, I now have, has shown that. There will be no economic loss as the type of power they use is now obsolete. The iron and other materials they contain can be produced directly by new methods that are simpler than salvaging that metal. They are, however, curiosities that the future will be interested in. The navy department of Japan will select the finest ship of each type from each of the navies of any other country, and I will then transport that ship to a selected spot well toward the center of the Sahara desert where they will be set up as museums of naval history.

"This is to be done within seven days, or the 'Terrestrial' will do it more completely. It must be done for the good of our race, and at last there is a power that can get it done—the 'Terrestrial!'"

Needless to say, it was done. We

all know the result. No armies meant no national-spirit—no race jealousies can exist unless there is some one to stir them up, and now it is to the benefit of no one to do so!

The laws that made possible the application of Waterson's new energies are well known—and this manuscript is not the place for quotation of international and interplanetary law. It was a great problem, and we must acknowledge the aid of the Martians in solving it. Their experience in the application of atomic energy was immensely valuable. The light beam communication that Waterson made possible has done as much for us as have the energies he released.

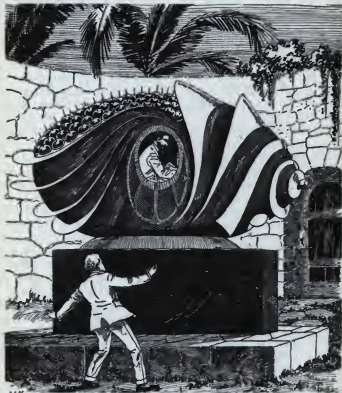
And the peace that exists between these two races must always exist, for they are the only neighbors Earth can ever have. And they did not damage us much. We still feel a bit of dread of them I suppose, but statistics have shown that the trouble man himself caused in his wild panics did far more damage than did the Martian heat rays.

May God help these twin races, so close both in bodily form and place of birth, to climb on in friendly rivalry toward better things through the eons, as long as our sun can yet support life on the globes that wheel around it, migrating from planet to planet as the race grows, and the planets cool, settling on them as the Martians have settled on Venus.

And thanks to Stephen Waterson's foresight and vision in establishing the Supreme Council of Solar System Scientists, we dare hope this may come true.

THE END

The Astounding Discoveries of **DOCTOR MENTIROSO** **A. HYATT VERRILL** Illustrated by **FRANK R. PAUL**



When A. Hyatt Verrill set out to write this "problem" story no one was able to anticipate the deluge of mail it would cause. But internal "flaw" or not this tale of "time-travel" has a way of still making people take a second look at the story and then at the horizon just to make sure the earth is still turning in its accustomed direction and that the sun still sets in the west!

Copyright 1927 by E.P. Co. Inc.

The Astounding Discoveries of Doctor Mentiroso

EDITOR of Amazing Stories,
Dear Sir:

As a constant reader of AMAZING STORIES, I have always been greatly interested in the various opinions expressed by your readers regarding the stories which have been published. I have been particularly struck by the fact that no two seem to agree as to the best or worst stories, or as to the improbability of the incidents related. Personally, I always feel that a story laid in the distant future, or on another planet, never seems to carry conviction, rather at the very outset taxes the credulity of the reader. But this is quite apart from the matter regarding which I am writing to you.

Among the many themes which have been criticised, and which many of your readers have declared impossible, are those dealing with the elimination of time, or which send the hero, if so he may be called, into the future or into the past. A short time ago I, too, agreed that it was utterly impossible and had no scientific foundation. And, were it not for your editorials in which you have so often pointed out that the impossibility of today may become the possibility of tomorrow, and have shown yourself so liberal and broadminded in your view, I would not now dare to address this communication to you with the expectation that you would give it the least serious consideration.

To be brief, and to the point: not only is it possible to eliminate time and enter either the past or the future: these things have actually been accomplished.

Do not think, when I make this bold statement, that I am of unsound mind, that I am perpetrating some new

hoax, or that I am trying to put fiction in the form of fact. On the contrary, I am merely calling to your attention the remarkable and generally unknown feats of a friend of mine, a highly educated and eminently scientific gentleman, who for several years past, has held the position of instructor in applied physics in the second oldest university in America, the *Universidad Santo Tomas*, at Lima, Peru.

Dr. Fenomeno Mentiroso is, as anyone in Peru can testify, a man whose word and honor cannot be questioned. His works on the higher mathematics and physics and his clear and concise exposition of the Einstein Theory, which was first read as a paper before the fourth Pan-American Scientific Congress in Lima in 1924, are familiar to every scientist throughout the world. He would be the last man to attempt to foster a hoax or to allow his imagination to wander into unproven fields but he is withal a very modest individual and dreads, more than anything else, lest any statement or declaration he may make should be considered fictional. And his latest exploit is so sensational, and to many persons will appear so utterly impossible, that he has absolutely refused to make public his discoveries or his unparalleled feat. Moreover, what he has done, is, as you will see, merely a beginning, and should full details of his work be made public, his further experiments and inventions might be greatly hampered. Still another reason that he has remained silent is that he expects that his remarkable invention, in its perfected form, will ultimately prove such an irresistible weapon of offense and de-

fense, that his country will be forever free from any fear of hostilities on the part of its traditional and warlike neighbor, the Republic of Chile.

It was solely because of the numerous allegations, on the part of your readers, that time could never be eliminated, and my insistence that his own accomplishment would prove the fallacy of such statements, and would at the same time set at rest the question of a fourth dimension, that Doctor Mentiroso reluctantly gave me permission to relate the facts to you.

But as I am no scientist, save for the interest I take in your scientific tales, and as physics, higher mathematics and fourth dimensional problems are quite beyond me, I shall recount, verbatim, as far as possible, my conversation with Doctor Mentiroso.

Some two months ago, during a visit to Lima, I had called, as I invariably do when in Peru, upon Doctor Mentiroso. I had just received a copy of AMAZING STORIES and somewhat jocularly presented it to the Doctor with the remark that it might give him some new ideas.

He glanced rather idly over the magazine, until his eye caught a page which instantly aroused his interest and indignation. "Idiots!" he exclaimed in his impulsive Latin way. "Idiots that people are! Did you read this, *Don Alfeo*?" Then, without awaiting my reply, he continued:

"Will the world never learn that there is no such word as impossible? Will people never cease to call 'impossible' everything they do not understand? Of a truth, my good friend,

the stupidity of my fellow men at times makes me ashamed of the human race."

"What," I asked, "do you refer to now?"

"To these letters," he exclaimed, pointing to the paragraphs he had read. "To these letters wherein the writers, who obviously know nothing of the subject, find fault with *Senor Wells*' and other author's stories because, they say there is no fourth dimension and because it is impossible to be in the future or the past coincidentally with one's existence in the present."

I laughed. "But that obviously is impossible," I replied. "And as for a fourth dimension—why, *amigo mio*, how can there be any dimension other than length, breadth and thickness? These stories, *Don Fenomeno*, are merely fiction, fiction glossed with science, it is true, but pure imagination none the less. You do not understand, perhaps, that they are not intended to be taken seriously."

The Doctor shrugged his shoulders and regarded me pityingly. "Fiction, I grant," he said, "but fiction only inasmuch as the names of persons and their particular adventures and feats are concerned. The basic facts in *Senor Wells*' story, and in the others also, are science. It is hard to explain to one who is unfamiliar with the involved theories of the great Einstein, of infinity and of electronic forces; but a fourth dimension is as essential to the universe and to science as is any one of the three recognized dimensions. And if a certain thing is essential to the universe, then, most truly, my friend, that thing exists."

"But," I objected, "if there is a fourth dimension, what is it? And why

has no one discovered it?"

"It *has* been discovered," declared my friend positively. "I, Doctor Fenomeno Mentiroso, have discovered it. And I will try to explain to you what it is, though I doubt if you can grasp it, for so accustomed have men become to think of the existence of things which do not exist, that the ordinary mind cannot grasp the existence of matters which they think do not exist."

I threw up my hands in despair. "It's beyond me," I declared. "If a thing exists which doesn't exist, and things which exist do not exist, then we must all be mad and the whole world must be topsy-turvy."

"On the contrary," he continued, smiling pityingly at my apparent ignorance. "It would be madness *not* to admit such obvious truths. You dream, my friend, and as you dream all that occurs is to your brain real and existent, and yet, when you wake, you feel convinced that your dreams were unreal, that nothing existed in them and that only during your waking hours do your senses record matters which truly exist. But suppose, if you can, that matters are in reality reversed, that your dreams are actualities and your impressions during waking hours phantasies. Or imagine again, that both your dreams and your waking-hour experiences are both equally real, but that, during your slumbers, you enter into another sphere, into the unknown, unexplored realm of a fourth dimension. What proof have you that your dreams are not as existent as your other impressions? None! my friend, not a shred of proof; merely the fact that for generations we have been taught that

dreams were imaginary figments of the brain. It is just as true of countless other matters. Does space exist? Do length, breadth and thickness exist?"

"Of course," I interrupted. "Otherwise no object, neither you nor I, could exist, and geometry and other mathematics could not exist. I—"

"Pardon me," he broke in, smiling deprecatingly. "But are you *quite* sure of that? A mathematical line, a mathematical plane, does not exist, and hence a mathematical cube or parallelogram cannot exist, and, if we accept *Senor* Einstein's theory, two parallel lines *will* eventually meet. The fact is, my friend, that we—or most of us at least—cannot grasp the infinite. We are bound down, tied hand and foot to our own petty sphere, to this earth of ours which is an infinitesimal atom in the universe, and we measure everything by earthly standards and by our own jive senses. We can conceive of nothing that we cannot smell, taste, touch, see or hear. No living man can conceive or describe any form totally unlike anything on earth. No man can conceive or describe a color or a sound unlike anything he has ever seen or heard. Did you ever think of that, *amigo mio*? And only a comparatively few men can realize that there is—scientifically speaking—no such thing as solid matter. A few years ago, a thousand things in common use today would have been scoffed at as impossible. Even today it is hard for the average man to understand radio, to understand why an airplane flies, and it is still harder to realize that objects which we speak of as solids are merely the result of combinations of electrons and protons. And it is a thousand times

more difficult for the average man to conceive of everything being, as is unquestionably the case, merely the result of vibratory waves."

"Hold on!" I exclaimed. "You are getting beyond me, and I cannot see where your highly entertaining lecture is leading. What has all this to do with the elimination of space? And how can matter be composed of waves?" Doctor Mentiroso sighed and shrugged his shoulders expressively.

"I forget, dear friend, that you are an example of the average man," he laughed. "All that I have said has a direct bearing on the elimination of space and the fourth dimension. But to answer our last question. We know that light, heat, sound electricity, radio, color, smell are all the result of vibratory waves. And beyond question there are countless thousands of vibratory waves too short or too long to be received or intercepted by the human organs. Heat vibrations are invisible until they are reduced to a length perceptible to the eye. Light vibrations are not detectable by the sense of touch or feeling until they are lengthened by the point where they are known as heat. Only a small percentage of sound vibrations are within the range of the human ear, and electro-magnetic vibrations cannot be detected by any human organ until so altered as to become sound waves."

I shook my head. "Before you proceed," I begged, "can you make this a bit clearer? You say that heat vibrations can be made visible, that light waves can be made detectable by touch. How?"

"If," replied Don Fenomeno, speaking slowly and choosing his words, "if you heat a bar of iron up to a

certain point it will burn wood or your skin and yet you cannot detect its heat by your eyesight. But if heated slightly more, it becomes red, and you know it is 'red hot,' as you say, because you see it. In other words, you have gradually decreased the length of the heat vibrations until they become visible. If the iron is heated still more, the red becomes white, or in other words the vibration have been shortened until they appear as white light to your eyes. Conversely, the white or red vibrations may be lengthened to invisible heat rays by allowing the metal to cool. In other words, light waves are lengthened until they become invisible but recognizable by touch they are considered heat."

"Then," said I, quite pleased with myself, "according to your theory, light and heat are identical."

"In a way, yes," replied Don Mentiroso. "But, in the same way, all vibrations are identical, for all are caused merely by the movement of electrons—forcing more electrons into a given space or depriving some space of its normal number of electrons. Possibly your mind cannot conceive the fact, but nevertheless, every force, every power, every motion, every body, and in fact everything we know—perhaps our thoughts, our senses and our so-called life—are merely the results of electronic motion."

"Well, even if I grant all this, what has it do to do with the original subject of our discussion?" I demanded.

"Everything," declared my friend. "Granted that everything is the result of electronic movement, and you know, of course, that the electrons are in effect miniature satellites revolving about a central nucleus, much as the

earth and moon revolve about the sun, then we must admit that nothing actual, as we know it, exists; that everything is merely relative and that time itself must be the mere expression, in arbitrary terms, of some electronic force or vibratory waves."

"Nonsense," I exclaimed. "I suppose you will be claiming that time does not exist."

"I know it does not," was his astounding reply. "It is merely a relative term coined for the convenience of the human race. But permit me to proceed. I will demonstrate this to you presently. You asked about the fourth dimension a moment ago. Now let me ask you a question. Has a circle length, breadth or thickness?"

"Why, of—" I hesitated. "Certainly," I declared after a moment's thought. "A wheel or a disk has thickness, and its diameter is its breadth."

Doctor Mentiroso laughed. "Right," he agreed. "But neither a wheel nor a disk is a circle; it is merely an object or form *bounded* by a circle. What is the definition of a circle. A mathematical plane with its boundary equidistant from its centre everywhere. Did not your geometry attempt to solve all problems by dividing the circle into triangles? And yet a triangle has three straight boundaries whereas a circle has no portion of its boundary or circumference straight. In other words, *amigo mio*, as a circle possesses neither length, breadth nor thickness, it must of necessity possess a fourth dimension, and the mathematicians, knowing nothing of a fourth dimension, must of necessity fit their geometry to the occasion and attempt crudely to transform it

into triangles which have length and breadth. And yet circles may be transformed to length or breadth just as triangles or parallelograms may be transformed into cubes or pyramids."

"Then," I laughed, "you consider the circle the fourth dimension?"

"Not at all," he exclaimed a bit impatiently. "I am merely trying to demonstrate to you that a fourth dimension *must* exist or otherwise there could be no circles and consequently no spheres and consequently no revolutions or rotations, of electrons, atoms, stellar bodies or anything else. The earth could not rotate on its axis, it could not follow its orbit about the sun for none of these things would be possible with the existence of length, breadth and thickness alone, with parallel lines which never meet and with mathematical planes. No, my friend, the fourth dimension exists, it is ever present, it is essential to our lives, to our existence and to our universe, but being as yet inconceivable to us, we cannot describe it, measure it or understand it. It is, in fact, beyond our present senses, just as the higher and lower sound vibrations, the shorter and longer light waves, and the radio waves are undetectable by our organs."

"That is a safe way of putting it," I said. "Of course, if we assume that no one can detect it, then no one can be positive that it does *not* exist. But don't you think all that is negative evidence? And how does it affect the question of time elimination, of going into the past or future while still in the present, which was, *Don Fenomeno*, the original matter under discussion?"

"I presume," he replied after a moment's thought, "that you do not con-

sider it possible to enter the future, while still in the present."

"I certainly do not," I assured him. "If that were possible, one might foretell with certainty what would occur tomorrow or a year hence."

"Precisely," he agreed. "And what if I assure you that you and I *can* foretell what will occur in the future."

"I should think, my friend, that you were absolutely mad," I replied.

Don Fenomeno arose, crossed the room to a table, and returned with a copy of *El Tiempo* in his hand. Glancing over it, he pointed to a paragraph and handed the newspaper to me.

"Will you be good enough to read that news item?" he asked.

"Nothing remarkable," I declared, as my eyes glanced over the indicated paragraph. "Merely the report of a railway accident in India, and the death of sixteen persons."

"Quite so," agreed Doctor Fenomeno. "And when is the despatch dated?"

"December 18th," I replied.

"And does it state at what hour the accident occurred?" he asked.

"Yes," I replied, reading from the paragraph, "as seven P.M. today the Jarabad local train which left Marajpore at 5:30 . . ."

"Enough," he interrupted. "The accident, then, occurred at 7 P.M. of December 18th. Will you glance at the date at the top of the page and tell me on what day this copy of *El Tiempo* was printed?"

"Why on the 18th of course," I replied.

"Exactly," he smiled, "and as you know, *El Tiempo* is on the streets of Lima at 6 A.M. Hence a paper sold on Lima's streets at 6 A.M. contained news of a railway accident in India

which did not occur until 7 P.M. of the same day. In other words, *El Tiempo* foretold exactly what would occur in another part of the world thirteen hours before the event took place. And yet," he added, shrugging his shoulder, "you assure me that it is impossible to enter the future while in the present."

"But, but," I expostulated, "it did not actually occur thirteen hours later. It's merely the difference in time between Peru and India; it was 7 P.M. there when 6 A.M. here. That's not—"

"Pardon my interruption," he exclaimed. "You say that it is merely the difference in time. Then you admit that time *is* merely a relative term. And you were about to state, if I am not mistaken, that the fact that the accident was reported thirteen hours before it occurred did not actually constitute entering the future. Ah, my friend, how inconsistent you are. Suppose, for the sake of argument, that you or I possessed means of traveling to or from India instantaneously, or even at undreamed of speed—at at speed which, let us say, enabled us to visit India and return in an hour or two. In that case, *amigo mio*, had you been in India when the unfortunate accident occurred, you could have flown here and could have declared—with absolute certainty—that a railway accident would occur and that sixteen persons would lose their lives at 7 P.M. even though you reached Lima at 6 A.M. And, supposing again, that no wireless communication existed, and that, in due course of time, mail from India confirmed your statement, would not the public have declared you a prophet

who could foretell the future?"

I was actually stumped. But presently I gathered my wits together. This was, I knew, utter nonsense. It was all the result of the variation in time due to the earth's rotation on its axis, and I felt that my friend was merely arguing for the sake of trying to convince me the impossible was possible by scientific theory. Doctor Mentiroso listened patiently, and with a half-pitying, half-indulgent smile, as I expressed these sentiments.

"You are, in a way, dealing with the pith of the whole matter," he announced when I ceased speaking. "That is, you refer to the variation of time, to the rotation of the earth, and by so doing you tacitly admit that time is actually non-existent, that, scientifically speaking, there is no past, no present and no future; for, if time, as you understand it, exists; if the past vanishes and the future is never present, then time would be the same everywhere. Your so-called time, therefore, is merely a relative term used to describe the motion of the earth in its relation with the sun. In other words, human beings have discovered that our sphere rotates upon its axis and follows its orbit about the sun, and for convenience, mankind has seen fit to divide the rotation and the orbit into periods which we are pleased to call hours, days, months and years. But time literally is a far different matter. It is in fact infinite, it goes on into infinity and springs from infinity. Nothing in nature, *amigo mio*, is ever wasted or destroyed, although it may alter in form or substance. The light we see here, the image which such light throws upon our brains by the medium of our eyes, does not end

here, anymore than it began here. It is merely a vibratory wave which has travelled millions of miles and will continue to travel millions, trillions of miles—into infinity in fact—and as it requires an appreciable period for even light to travel, every visible event of the past must be somewhere in that infinity just as every event of the future must be recorded somewhere and is travelling toward us to be revealed when it reaches us. In the same way, time is but a vibratory wave, a movement of electrons, and could one but follow the path of time at a greater speed than the vibratory wave travels, then most assuredly, could one witness events which transpired a hundred or a hundred thousand years ago. Or, going in the other direction, he could see events which would not transpire on earth for thousands of years to come. I—"

"Hold on," I cried. "You are merely theorizing, carrying scientific hypotheses to the ultimate degree. And besides, even if I admit your preposterous statements to be theoretically sound, you are carrying the whole matter beyond the range of possibilities of human beings and into space; they do not apply to happenings on earth and hence, as I said before, it is impossible for us to enter either the past or the future."

I thought I had stumped my friend, but I was mistaken.

"Very well," he agreed. "It is hard, I admit, for the average man to visualize or comprehend anything beyond the confines of our own planet. So, my friend, we will confine ourselves to this petty earth of ours. And to prove to you that my statements and 'theories' are sound, let me call your

attention to a few facts which, with a little reflection, you must recognize as irrefutable. The earth, you know, revolves from west to east at an approximate speed of 1,000 miles per hour, and hence each so-called hour of time represents approximately one thousand miles of earth's greatest circumference. Bear in mind, please, that in speaking of these matters, I am referring always to approximate figures—though if you wish, I can give you the exact figures. But to resume. Granted then that it is, according to the accepted ideas of time, noon, Monday, in Lima; it will be approximately six P.M. in London or Barcelona; 12 P.M. in Calcutta and 6 A.M. in Hawaii."

"Yes," I assented. "Roughly speaking, that is so."

"Very well," continued Doctor Mentiroso. "Suppose, for the sake of argument, that you are provided with a machine which can travel through the air at a speed of 1,000 miles per hour, and supposing that in this machine you start eastward from Lima at noon today. It is also assumed that you will set your watch in accord with Lima time and will not alter it until you again arrive at Lima. At what time would you reach Barcelona?"

I did a bit of mental calculation and replied confidently: "At 6 P.M." Don Fenomeno laughed heartily. "Oh, my dear friend," he exclaimed. "Wrong at the very start. You forget that at the moment you left Lima it was noon and hence 6 P.M. in Spain. And as you have supposedly consumed six hours in reaching your destination, it will be 12 A.M. when you arrive there, although your watch will tell you that it is but 6 P.M. So you have al-

ready traveled six hours into the future. Very well. Suppose you leave at once for Calcutta; at what hour will you arrive at that Indian city?"

This time I was a bit more careful, and after a moment's hesitation replied: "At noon on Tuesday."

"Exactly—according to Calcutta's clocks," assented my friend. "But suppose you glance at your watch. You will find that it is only 12 P.M. on Monday, so that you have now entered twelve hours into the future. But continue eastward and head for Hawaii. Reaching that delightful spot, what time do you find it is?"

Rapidly figuring with a pencil on a scrap of paper, I gave my answer: "Approximately 12 P.M. Monday."

"And according to your watch 6 A.M. Tuesday," chuckled the doctor. "In other words, you find Hawaii's time precisely the same as was Calcutta's six hours before, while you have traveled back from the future six hours towards the present; and continuing your mad flight to Lima, you will discover that you complete your journey around the earth at noon on Tuesday—twenty-four hours after leaving; and remarkable as it may seem your watch and the clocks in Lima agree on the hour. By some mysterious means, you have come back to the present after entering the future to the extent of twelve hours."

"But," I objected, "you forget that in crossing the approximate 180th degree of longitude in the Pacific, a day is added or subtracted according to whether one is traveling east or west."

"Quite true," agreed the doctor. "But supposing you had done so, then when you arrived in Lima, it

would have been a day later, whereas it would of necessity—considering that you circumnavigated the earth in twenty-four hours—be the same day. And to further prove the fallacy of your argument; suppose you start from Lima in a westerly direction, stopping at the same points as before. In that case, *amigo mio*, be good enough to tell me at what hour and on what day you would arrive at Hawaii?" "That is easy," I declared. "I would arrive at Honolulu at approximately 6 P.M. on Monday."

"By your own watch, yes," chuckled my friend. "But at noon on Monday according to the time in the Hawaiian Islands. In other words, you might truthfully be said to have traveled from Lima to Honolulu instantaneously. But if you continue on your westward flight, at what hour, by Calcutta time, would you arrive at the town?"

"I suppose there's a catch in it," I replied, "and I confess I'm getting so confoundedly confused that I might as well guess at it: I should say at 6 A.M. Tuesday."

Doctor Mentiroso laughed good naturedly. "No, my friend," he announced. "It would be at noon on Tuesday, for during the twelve hours which have passed since you left Lima, twelve hours have also passed in Calcutta, although your own timepiece would indicate that it was 12 P.M. on Monday, so you would again be 12 hours in the future. But continuing on your way you would find, on arriving at Barcelona, that it was still noon on Monday, although 6 A.M. Tuesday by your watch, so that you had leaped from twelve hours into the future and were now back six hours

towards the present. Continuing onwards, you would reach Lima at 12 noon on Tuesday, your watch would indicate noon on Tuesday, and you would suddenly discover that you had been in three places separated one from the other by nearly six thousand miles, at precisely the same hour."

I threw up my hands in despair. "I know you are juggling figures," I declared. "But I'll be hanged if I see where it comes in. I suppose you still have something up your sleeve. Well, fire away, I'll be the goat."

Don Fenomeno nodded and smiled. "Then let us assume that your purely imaginary aircraft is capable of traveling at the rate of 24,000 miles per hour or that, in an hour's time, you can circumnavigate the earth. In that case, starting from Lima at noon on Monday, and rushing eastward, you would arrive in Barcelona at 6:30 P.M. on Monday, though your watch would show it to be 12:15 P.M. You would reach Calcutta at 1 A.M. Tuesday, although still only 12:30 on Monday by your watch. At Hawaii you would find time had leaped back to 6:30 A.M. Monday, despite the fact that your watch showed 12:45 of the same day, and at 1 P.M. on Monday by your watch you would be back in Lima where the clocks would prove to you that it was 2 P.M. despite the fact that you had been absent only one hour."

"And what marvelous thing would occur should I reverse my flight and travel westward?" I asked.

"In that case," he replied, "you would be in Honolulu at 12:15 Monday by your watch, but at 6:15 A.M. by the local clocks. At Calcutta you would find the inhabitants soundly

sleeping at 12:30 A.M. Tuesday, although by your own time it would be barely half an hour after noon on Monday. At Barcelona the working people would be going home from their labors at 6:45 P.M. on Monday, despite your watch telling you that it was 12:45, and you would get back to Lima at 1 P.M. on Monday to find that your watch agreed with Lima's time. And now, if you are not being bored, let me give you a still more striking illustration of the purely imaginary and relative status of what we ordinarily call time. If, when in your 24,000 mile per hour craft, you set your watch in accord with the local time at each point of call it would work out thus when going east: Leaving Lima at noon on Monday you reach Barcelona at 6:30 P.M. Monday, and setting your watch to agree, you proceed to Calcutta where you arrive at 1 A.M. on Tuesday to find your watch indicates 6:45 P.M. Monday. Again altering your watch and heading for Hawaii, you arrive there at 7:30 A.M. Monday, regardless of the fact that your watch says 1:15 A.M. Tuesday and, having readjusted the latter, you proceed and reach Lima at 1 P.M. Monday and find your watch is at 7:45 A.M. Monday. Thus you will have been in the future over six hours at Barcelona, and over eleven hours in Calcutta, but you will have been into the past eighteen hours in Hawaii and back in Lima *five and one-half hours before you left this city.*"

"That," I ejaculated, "is ridiculously impossible."

"But nevertheless true," declared Don Fenomeno. "Moreover, should you follow out the same system and

travel west you would return to Lima to find that, according to your watch, you had consumed six hours on your journey although you knew you had been away only one hour." "It's all bosh," I declared. "It's like proving black is white or that a cat has three tails, by mathematical formulae. Anyhow, it's impossible, for it is impossible to travel one thousand miles per hour, much less twenty-four thousand."

My Peruvian friend raised his dark eyebrows and shrugged. "Be very sure, my good friend, how you use the word impossible," he advised me. "Do not forget that, twenty years ago, anyone would have declared it impossible for man to fly in the air at over one hundred miles per hour, and that, scarcely longer ago, it would have been deemed equally impossible to construct a motorcar which would reach a speed of fifty miles an hour, not to mention one hundred miles and more. But before challenging your statement, let me for the sake of clarity, give you a brief summary of the examples I have been drawing for your edification. Your watch, as you have seen, if kept at Lima time, would be constantly in the present (speaking approximately and regarding for our purpose the space of one hour as present) and yet you would have been at spots where yesterday's events were occurring and at others where tomorrow's happenings were taking place. And, this, my friend, is important: Provided the speed of the machine in which you travel could be accelerated so as to travel faster than light, you could go backward or forward into the past or present or into the fourth dimension. Moreover, as the human eye is incapable of registering the al-

ternating effects of darkness and light at a speed greater than about 20 per second (exemplified in the cinema), if you were passing rapidly enough about the earth, you could see no difference between light and darkness, could not realize time, and would appear to remain stationary and with time non-existent; and at the same time, you would be quite invisible to the eyes of any human beings. But even if your speed were not greater than the moderate speed of 24,000 miles per hour, you would of necessity go farther and farther into the past and future at every lap about the earth until—”

“Moderate speed,” I interrupted. “I like your idea of speed. Why, at that speed any machine would become incandescent through friction, and would be transformed to gas and ashes. Now don’t try to kid me into—”

“Don’t think for a moment I am endeavoring to ‘kid’ you as you call it,” said Doctor Mentiroso, in injured tones. “Nothing is farther from my thoughts. I started out to convince you that the elimination of time was not impossible, and that a fourth dimension exists and has been discovered by me, Doctor Fenomeno Mentiroso, your most humble servant and very good friend. I admit that, under ordinary conditions, a machine traveling at such high speeds as I mentioned, would become heated to the incandescent point, but such a result would be due entirely to the friction of the air. Suppose then that the machine should travel beyond the atmospheric envelope of the earth, or that means could be found for eliminating air friction. In that case, you must admit there would be no fear of heating.”

“You can suppose anything,” I replied. “But suppositions are not actualities, and no one will ever be able to travel through space or overcome air friction. That, at least, you must admit is impossible. “On the contrary,” declared *Don Fenomeno*, “I insist that it is not only possible but that it actually has been accomplished.”

I gazed at my friend in incredulous amazement. Had Doctor Mentiroso taken leave of his senses? Or was he merely trying to lead me on for the sake of argument? Unquestionably, I decided, it must be the latter for my friend was obviously as sane as ever, and was smiling at me in such a supercilious, or rather I might say, triumphant manner, that I was quite sure he had something up his sleeve.

“Perhaps,” I suggested with a laugh, “you mean it has been accomplished theoretically. And by the way, did I not understand you to say that you had discovered the fourth dimension? Let’s hear about that.”

“You understood correctly, *amigo mio*,” replied *Don Fenomeno*. “I have discovered the fourth dimension, and instead of accomplishing the feat of overcoming friction on a rapidly moving body on paper, I have accomplished it in fact. Moreover, the two discoveries are closely correlated, or, shall I say, dependent one upon the other. Had I not discovered the secret of the fourth dimension, I could not have accomplished the even greater feat. And, paradoxical as it may seem, had I not accomplished the latter, I would not have discovered the secret of the fourth dimension.”

“I suppose,” I remarked sarcastically, “that you will now inform me in

all seriousness that you actually have constructed an apparatus capable of traveling one thousand miles an hour or more."

"Decidedly more," was his calm response. "To be exact, very nearly ten thousand miles an hour, and—"

"You're absolutely mad, my friend!" I exclaimed. "But go on, one must humor the insane. Next, I presume you will assure me that you have flown in your dream machine, perhaps have even circumnavigated the world, and have thus proved the possibility of entering the future."

"I shall begin to believe in mental telepathy, if you continue," he laughed. "Your presumptions are extraordinarily correct. I *have* flown—or rather traveled, in my 'dream' machine as you see fit to call it, and I *have circumnavigated the world at a speed* nearly eleven times the speed of the earth's rotation, I—"

"Wait a bit!" I cried, now convinced that my friend had taken leave of his senses, but anxious to see how far he had gone, "You spoke of your apparatus traveling ten thousand miles an hour and now you tell me you have traveled around the earth eleven times faster than the globe rotates on its axis. I don't get that."

"I forgot to mention," he explained, "that the discovery of the principle of the fourth dimension also included the elimination of gravitational attraction, as it is commonly called, and as I have already told you that my discoveries do away with atmospheric friction you will at once understand that a machine traveling at an initial velocity of ten thousand miles an hour, and free from atmospheric friction and gravitational pull, will, when headed

eastward, travel at that speed plus the speed of the earth's rotation, or approximately 11,000 miles an hour. I think—"

"Very good," I agreed, still determined to humor him, "but if there is no attraction of gravitation, why did you not fly off into space?"

"The fourth dimension again," he answered. "It will, of course, be difficult for you to understand, but I'll try to explain it in terms which are familiar to you. And I see that you think I am crazy. I'm not surprised, my friend, but as a matter of fact, I was never saner. I think, before I am through, that you will realize this. But to reply to your most natural query. If, for example, you jump into the air, you temporarily overcome gravitation through the use of muscular power which is greater than the force of gravity on your body, but you can only jump so far. In other words, your limit is one of the three recognized dimensions. If you jump longitudinally, the same thing occurs, for your leap is limited by length; and here let me call your attention to a very ordinary, but hitherto entirely overlooked matter, which is of the utmost importance. When you leap upward, you return to your original position or to the earth in an approximately straight line. But when you leap longitudinally, you travel from start to finish in a curved line. Although, so far as I am aware, this phenomenon has never attracted much attention, it is an indication of the existence of the fourth dimension. But I am digressing. Just as your recognized three dimensions measure your jump perpendicularly or horizontally, so the fourth dimension regulates or controls the dis-

tance my apparatus can move against gravitational pull; perhaps it might be better to say that the gravitational pull controls the fourth dimension."

"Another point," I insisted. "If you overcome air friction, how do you propel your machine? I may be a layman, but I fail to see how any apparatus can be propelled without friction. I have always understood that it was frictional resistance which propelled an airplane."

"Usually it is," he replied. "But in the present case, no. My apparatus embodies an entirely new principle. I am very sorry, but I scarcely like to divulge it at present, and," he added with a laugh, "you probably wouldn't be any wiser for the explanation."

"I might if I could see it," I suggested.

"Possibly," he repeated with an odd smile. "But we will leave that until later. As I remarked, it is difficult for me to convey an adequate idea of my apparatus, but I will do my best. Relieved of what is known as the attraction of gravitation, the machine of course, rises or is thrown violently upward from the earth, its upward flight controlled by the use of the fourth dimension, which, for reasons I will explain, I have called 'Esneson.' Being free from air friction, as I have already said, it remains stationary while the earth and its envelope of atmosphere whirls from east to west at 1,000 miles per hour."

"But you stated that your machine traveled at a speed of 10,000 miles per hour," I objected.

"So it does," he declared, as calmly as though speaking of fifty or one hundred miles an hour. "And that speed, added to the speed of the earth's

rotation, equals the 11,000 miles I referred to. But, my good friend, I have already told you that; how many times must I repeat such simple matters?"

"They may appear simple to you," I said, "and you may be sane as you say, but to me the mere thought of such speed is too staggering to believe. And I still fail to see how you propel your machine when, as you claim, you eliminate air friction or pressure or whatever you may call it."

"I was coming to that very point when you interrupted me," he replied a bit impatiently. "As I said, the earth's atmospheric envelope is sweeping past the apparatus at a speed of 1,000 miles per hour. In other words, the apparatus stands isolated in the centre of a one thousand miles per hour hurricane. Is that clear?"

"Perfectly clear," I assured him.

"Very well," he continued. "Now let me ask you a question. Did you ever hear of the so-called rotorship, a vessel invented and constructed a few years ago by a German?"

"Certainly," I replied. "The vessel, as I recall it, was provided with large cylindrical masts or towers which were revolved at high speed, the idea being that wind impinging on a rotating surface produces a vacuum and forces the rotating surface forward. But the rotor ship, I believe, proved a complete failure. Anyhow, what has that do do with your discoveries?"

"Nothing, directly," he said, "I was merely seeking some familiar thing which I could use as a comparison to enable you to grasp the basic principles of my apparatus. And I might add that the rotor-ship was not a failure from a mechanical or scientific

point of view, but was merely commercially impractical, owing to various factors which in no way affect its principle. But to continue. If, when within the mass of air moving at 1,000 miles an hour, a portion of that force of air were permitted to strike upon a revolving surface, my apparatus would rush forward exactly as the rotor-vessel was propelled, only immeasurably faster."

"I can understand that," I admitted. "But it certainly would not move forward at 10,000 miles an hour when the speed of the air was only 1,000 miles an hour. Moreover, what means could you employ to prevent the air friction if you used that friction for your propelling force? It seems to me, my friend, that you are contradicting yourself."

Again, *Don Fenomeno* smiled that superior and condescending smile. "Suppose the entire frictional force were exhausted in propelling the machine," he observed. "And by rotating the rotors, as we may call them, rapidly enough to absorb all the friction, and by allowing the friction of the air to act upon certain properly designed surfaces elsewhere, the apparatus would and actually did travel at the speed I have mentioned, although I admit I employ the gravitational pull as an auxiliary force. Just as an airplane rises and moves forward because of the angle of incidence upon its planes, so by utilizing the gravitational force which would tend to draw my machine to earth, and then by special apparatus preventing it from descending, I would achieve a similar result and force the machine forward."

"But tell me," I broke in, now thoroughly interested and quite oblivious

of the seeming impossibilities he was describing. "Tell me what power you use to accomplish these marvels. And what is this fourth dimension or 'Esnesnon' as you call it?"

"I'll answer your last question first," he replied. "Although, as a matter of fact, I cannot exactly explain what 'Esnesnon' is myself."

I laughed. "You say you've discovered something you cannot describe," I exclaimed. "Come now, *Don Fenomeno*, aren't you trying to see how far you can spoof me, as the British say?"

Doctor *Mentiroso* flushed. "If it were not for the fact that you are a very old and dear friend of mine, and inexpressibly stupid, I should take offense at that remark and should refuse to say another word," he declared. "But under the circumstances, *amigo mio*, and knowing that you are really most *simpatico*, and that it is most difficult to convince one of anything quite new and revolutionary. I shall with patience control myself and will do my little best to convince you that I am serious and at the same time make clear to your uncomprehending mind exactly what I have done and how it has been accomplished. You say I contradict myself . . . My friend, you no doubt admit the existence of oxygen, of hydrogen, of nitrogen, of electricity, of radio waves and of numerous other things which the world accepts and uses in every walk of life. You admit, unquestionably, that the entire life of our planet, if not other planets as well, the existence of the universe in fact, depends upon the gases I have mentioned. But can you or any other man describe them? Can you give a clear definition of what

oxygen, for example, is like? Have you or has anyone else ever seen it? And yet it has been discovered; it is in daily, hourly use; it is combined, isolated, confined, and, in combination with other materials, it assumes tangible forms. The same is true of electricity, of radio waves, of countless other things I might mention. 'Esnenon' is much the same. It is invisible, intangible, indescribable, and yet without it the universe could not exist, and like many other things, it can be isolated, utilized and combined with other things."

"Hmmm. There may be something in that," I admitted. "You say the 'Esnenon' is not a force but a dimension. What then is the power or force you employ to achieve your amazing results?"

"The greatest force or power in the entire universe," declared *Don Fenomeno*. "The force which, for want of a better term, is known as the attraction of gravitation; the force which holds the planets to their orbits, the earth to its rotation, the spheres in place, and prevents you and me and the world about us from being transformed into attenuated gaseous matter."

I shook my head in despair. "You're getting beyond me again," I expostulated. "I've always understood that the attraction of gravitation is downward or towards the centre of the earth. In that case, I can't see how you can utilize the power except for coming down."

"Of course the pull is downward, or rather towards the center of the earth—or towards the actual mass of any object," he exclaimed. "Every body has its gravitational force, which

is exerted upon other bodies. But please understand, my friend, that the so-called attraction of gravitation is an electronic force and not a magnetic force. As far as your other question is concerned, may I call your attention to the fact that the force of water is also downward, you never saw a waterfall flow upward; and yet, as you know, water power may be utilized for innumerable purposes and to produce force for driving mechanisms in every direction. The same is true of the force of gravitation. Once its mysteries are mastered, it may be used as freely as water, steam, electricity or any other force, and being the supreme force of all forces, and the source of all, its power properly directed, is millions of times greater than any other known power."

"But how on earth did you happen to discover all this?" I demanded at last convinced that Doctor Mentiroso had actually accomplished seemingly impossible feats beyond my wildest dreams.

"In a way," he replied. "I cannot claim to have discovered these things. I have rediscovered them. They have been known for centuries—perhaps thousands of years. No, do not look so skeptical, *amigo*. I am speaking the unvarnished truth and will explain. As you know, far more Inca than Spanish blood flows in my veins, and for long I have devoted much time to studying the history and remains of my ancestors. The stupendous works of the pre-Incas in particular have always been a source of marvel and wonder to me, as to yourself and to countless thousands of other men. Feats which they performed seem almost supernatural, as you know. The

massive walls about Cuzco and Lake Titicaca, walls composed of stupendous blocks weighing scores of tons; blocks of twenty to thirty or more faces, and each so perfectly cut and so accurately fitted that even today a pen-point cannot be inserted between the stones; the cyclopean monuments and buildings; the tunnels cut-through many feet of living rock; the enormous fortresses; the marvellous metal work, all these facts performed by the long-dead race have puzzled every archeologist and no one has hitherto been able to explain by what unknown means they were accomplished. But to me, and now that I am about to divulge it, to you, the secret is known at last. All these great feats, my friend, were simple matters to my ancestors, for they, of all men, had discovered the fourth dimension and the key to utilizing the forces of gravitation. Two years ago, in the unknown and unexplored territory east of Lake Titicaca, I learned of a ruined city from the Indians. There I went and found, hidden in the forest, the ruins of a pre-Incan city of vast extent. In all Peru no other such ruin had ever been found, no other had remained so well preserved, for the Spanish conquerors had never reached it, and it had remained unmolested and free from looting and vandalism for hundreds, perhaps thousands of years.

"Here I set up my camp and for days studied the countless carvings and inscriptions that covered walls, columns and monuments; here for the first time, I found hieroglyphs that seemed to me possible of interpretation. But I could make little of them, familiar as I was with the language of the Incas. At last luck or fortune,

or perhaps the spirits of my ancestors, favored me. An earthquake rent the ground and threw down a massive piece of wall to disclose a hidden chamber wherein were stored priceless records of the race who once had dwelt there and who, as I soon learned, were the highest caste of the mysterious pre-Incan people.

"Here, too, and most wonderful of all, was the key to the glyphs, besides countless strange instruments and utensils; wonderful works in copper, bronze and gold; plans of the monuments, the fortresses and the walls which exist throughout Peru today, and here, as frantically, fascinated I studied the glyphs and records, I learned that my ancestors, fully twenty centuries before the coming of Pizarro, had mastered the secrets of the fourth dimension and of gravitational force and had harnessed them and by their aid had accomplished the seeming miracles of cyclopean work which we wonder at today. It would be of little interest and would be a long story to tell you all the details of my discovery, *amigo mio*. But to me, a descendant of that strange highly civilized but forgotten race, was given the fortune to learn the secrets and laws of nature which, centuries ago, had been discovered, and centuries later had been lost through wanton destruction of a nation. And herein, my friend, my ancestors failed. All they had learned they had applied to peaceful arts; never did it occur to them that the tremendous, the irresistible forces they alone knew, could be used against their enemies, that no beings could resist them. But I, I *Don Fenomeno Mentiroso*, *senor*, I am not so blind. With the powers and forces I have re-

discovered from the records of my ancestors, I have within my grasp that which will place my country forever beyond fear of conquest or of war. The united powers of the world might attempt to subdue or to humble Peru, but they would be as powerless as so many buzzing flies. Their navies could be destroyed, their armies wiped out, their artillery rendered useless, their aircraft annihilated as fast as they could be assembled; this could be done by means with which they could not cope. It is for that reason that I will never divulge my secrets. But do not think that I fail to realize the importance of my discovery to the arts of peace. But, greater to me is the importance of my accomplishments as a safeguard to my country. I . . ."

"Yes, yes," I interrupted, seeing that my temperamental and patriotic friend was rapidly working himself into a fervor, and Latin-like would continue his oratorical talk indefinitely. "Yes, *Don Fenomeno*, my good friend, I can clearly see your point. It is indescribably noble of you and worthy of a son of the Incas. But let us leave this side of the matter for the present and confine ourselves to a further consideration of the scientific and practical side of your most marvellous discoveries."

"Most certainly," he exclaimed. "Pardon me for so far digressing from the theme. Let me see, I was telling you of the power I employ and you asked how I happened to discover it. Now—"

"You have explained that," I reminded him. "And while I do not fully grasp all the technicalities of your twin discoveries or of your apparatus, I think I understand the principles,

although I admit the whole affair is so absolutely astounding as to seem incredible. And I freely admit that were anyone but yourself to make such statements I should unhesitatingly put him down as worthy rival of Baron Munchausen."

My friend rose and bowed. "Thank you, a thousand thanks to you, *amigo*, for the implied compliment," he laughed.

"But there is another question," I continued. "Did I understand you to say that you actually *had* traveled around the earth on your, or in your secret apparatus?"

"You did, and I have," he assured me, "not once but several times, and each time my observations and records proved conclusively that my deductions and calculations were sound and correct, and that with the proper means at my command, I can go into the future or the past and can eliminate 'time' as you call it. Strictly speaking, of course, time is but a relative term, a mere arbitrary word, whereas actual time is a wave governed and controlled by the 'Esneston,' and is no more like your arbitrary conception of time and bears no more relation to it than oxygen does to water or nitrogen bears to nitrate of potassium. In other words, my friend, your so-called time is governed by the 'Esneston' while the true time, and by that I mean the phase of the vibratory time wave, is not in any way affected by your conception of time. Is that clear?"

"About as clear as mud," I grinned. "But if you have traveled about the earth at 11,000 miles an hour, how in the world could you see or observe

anything while moving at that rate of speed?"

"Oh, my poor friend!" he exclaimed pityingly. "Can you not grasp the fundamental truth that all things are relative? To you, a speed is great or small merely by comparison with your much slower motions and surroundings. Were you dropped from a thousand foot precipice, you would see nothing but a blur as you hurtled earthward, but the condor or the eagle, dropping for thousands of feet, and at terrific speed, sees the smallest bird or animal and strikes it unerringly. And so, in an apparatus wherein your cloying, arbitrary time is non-existent, and surrounded and controlled by the fourth dimension, a speed which to you would seem incomprehensibly swift, seems merely a slow and steady jog to me. Indeed, though perhaps you will not believe it, my circumnavigation of the earth appears to me, at the time, to be no shorter than when, several years ago, I went around the world in one of the Dollar Line steamships. Not until I return and step from the fourth dimensional machine into the hum-drum present, do I realize that the journey has consumed only an hour or two. Now if only you, too—"

"Nothing doing," I announced positively, before he could complete his sentence. "I'll leave it to you. But tell me, when did you make your last trip?" I asked.

He laughed. "At midnight, last night," was his amazing reply.

"What?" I gasped. "What nonsense is this? You say—"

He raised his hand and checked me. "Have you forgotten so soon all the examples I gave you?" he asked. "Do you not remember that I pointed out

that, if you should travel eastward at a speed greater than the rotation of the earth, you would be back in Lima before you started? For example, I am planning another trip today, and as I travel at a rate of approximately 11,000 miles per hour, and start at eleven thirty—precisely one hour from now—I will of necessity be back this morning at 7:30, the slight difference in figures between my example and the actuality being due to the fact that my route does not precisely follow the equatorial circumference of the earth."

I sank back in my chair and ran my hands through my hair. "It's all the dreamiest, weirdest hodgepodge, the most involved and incomprehensible thing I ever heard," I cried. "Why, man alive, if I'm hearing aright, and you're serious, then in an hour you'll start off and this morning at seven-thirty you'll be back, and I'll be here at nine and you'll tell me all this damned nonsense over again, and start again, and . . . why confound it all, if that's true, today'll go on forever or . . . good Heavens, it makes my head reel to think about it."

Doctor Mentiroso laughed heartily. "My dear good friend," he exclaimed. "Do not be so perturbed about it. You forget that you are talking and thinking of arbitrary time, whereas I am referring to fourth dimensional, or real time. No, my friend, though by your time I may set forth at half after eleven today and return this morning at seven thirty, yet by actual time I set forth and returned at precisely the same moment of your time. No—be patient a moment, for there are many puzzling features of the matter, some of

which I confess I have not fully mastered myself as yet. But it is obvious, *amigo mio*, that did I actually arrive at seven thirty this morning from a trip on which I am to start out four hours after I arrive, then I certainly could not be present in the interim. But I propose, my friend that you witness a most interesting experiment which, if I am not mistaken, will convince you of the soundness of my statements. You can be of great help to me then."

"I'll gladly do anything within reason to help you," I assured him, still a bit dazed at the nightmarish problems his words had started in my mind. "But I'll do nothing rash, and I will *not* try any stunts in that mad machine of yours. For that matter, I'm beginning to think it's all bosh and you have no such machine."

"I'll soon convince you of that," he declared. "But what I am about to ask you is neither rash nor risky. I would merely like to have you witness my departure and return and check up on the phenomena. If, as you and others claim, your so-called time really exists, then beyond question, I cannot encircle the globe—no matter how fast I travel, and yet be back hours before I set forth or even instantaneously. On the other hand, if I am right and your time is a ridiculous, nonsensical and childish thing, with no basis, and true time is entirely distinct, then I will of a certainty be back before I start or at least at the same moment. Are you willing, *amigo mio*, to try the test?"

"Gladly," I declared. "Come, show me your 11,000-mile-an-hour machine and hop off for a trip around the earth, and I'll wait and time you. You can't keep up this joke much longer, old man."

Once again, *Don Fenomeno* smiled in his oddly superior way and rose from his chair. "Very well, my good friend," he remarked. "I think within a few moments you are due to have a rather astounding surprise."

He led the way through a heavily barred and padlocked door to a large windowless room, or rather, I might say, an open court enclosed by high massive walls. In the centre, and resting on a sort of pedestal of black stone, was an elliptical or egg-shaped contrivance of a peculiar bluish color, reminding me of blued steel, and about thirty feet in length by eight or ten feet in diameter. I regret that I cannot give a detailed description of the thing, for one of the conditions on which Doctor Mentiroso insisted before granting me permission to make public his discoveries, was that I should omit all detailed descriptions of his apparatus or its mechanism. I may state, however, that the exterior of the machine was covered with spiral flanges or bands, so that it had somewhat the appearance of a gigantic screw; that several pyramidal or mushroom-shaped projections broke its surface, and that it had no wings or planes like an airship.

"This," announced my friend, "is the machine which I referred to."

"It appears to be a machine all right," I admitted, "but it certainly does not appear capable of rising or of progressing, and even more certainly not at any such speed as you claim for it."

Don Fenomeno laughed. "Appearances," he reminded me, "are often very deceptive. But as you say in English, 'the proof of the pudding is in the eating.' In a few moments, my

friend, you will change your mind. And let me forewarn you; you may witness some rather disconcerting events but you need not be either surprised or alarmed at anything which may transpire. It now lacks but three minutes of the time for my departure. Will you, *amigo mio*, stand here and time me in my flight around the earth?"

"Gladly," I replied, "provided your flight does not consume too much time. For I have not eaten lunch as yet, and if you are not back within an hour or two—and I haven't the least expectation that you will be—I warn you that my appetite will overcome my curiosity and I shall go out and eat."

"You will not have to go hungry long," he declared. "Even if you are right, it will be a short time before I return."

"That is, if you go or return at all," I said. "But let us get this clear. You claim you'll return before you start or at the same time, which I claim is manifestly impossible; I claim that, granting there's no fake to all this and that by some incredible means you *can* fly around the earth in that contraption at the speed you state, you'll be back here in approximately two hours. Am I right?"

"Absolutely," he agreed while he approached the mechanism and stopped to examine some knobs and dials on the black rock pedestal. "Would you mind," he asked, "standing about here. You'll be better able to witness some of the phenomena which may take place." He indicated a step leading to the pedestal. It was, as he said, a fine point of vantage, and anxious to make sure that there was no trickery about the matter, despite my faith in

Don Fenomeno, I took my place as he suggested. Smiling, my friend then stepped into his machine, climbed upon it, and opening sliding panel, stepped within. "Don't leave until I'm back," he cautioned me, as with only his head visible he prepared to close the door. "It's important for you to remain exactly where you are. You see," he added as if in explanation, "I cannot be a witness of the phenomena and I want you to tell me about everything that takes place. Now, take out your watch and time me, for I'll be off in a jiffy."

As he spoke, he ducked into his machine and drew the panel shut. Wondering what, if anything, would happen next, I glanced at my watch and found it precisely eleven thirty. As I did so there was a strange roar from the machine before me; a sudden wind seemed to sweep with terrific force across the courtyard; I swayed on my feet; my head swam dizzily; I had the impression of being hurled over and over, and then, as suddenly as it had begun the noise ceased, the air was calm and still and my head cleared. I glanced at the pedestal and stared with unbelieving eyes. The egg-shaped apparatus had vanished! It was true then! My friend had actually taken flight in his strange machine. Undoubtedly that explained the rush of air and my sensations, for assuredly a mass of that size could not have hurtled upward at over ten thousand miles an hour without creating a terrific vortex in its wake. Hardly had these thoughts rushed through my brain when once more the blast of a hurricane roared about me; I clung for dear life to the stone pedestal; for a brief second I seemed to lose consciousness, and as before, the

wind ceased, my brain cleared, and as I raised myself from my recumbent position I almost cried out in amazement. Before me, and resting within six feet of where I stood, was the bluish ovoid thing into which Doctor Mentiroso had vanished. It was incredible that he could have gone far in the few brief seconds which had elapsed. No doubt, I thought, he had had trouble, or had returned for some other reason, and I had completely forgotten to look at my watch. A glance showed me, however, that less than one minute had elapsed!

The next second the slide in the machine opened, *Don Fenomeno's* head appeared, and as I stared at him, he sprang from the machine. As he did so, a sudden wave of darkness seemed to envelope me; I had the terrifying sensation of having gone blind; and with a sharp cry I put my hands to my eyes. Instantly, it was full sunlight once more, my friend's laugh sounded in my ears, and I looked up to find him standing beside me with a triumphant smile on his face.

"Well, what think you now, *amigo mio*?" he exclaimed.

"I think I'm mad," I replied. "Do you mean to tell me—"

"That I have again circumnavigated the old earth?" he chuckled. "I certainly do, my friend. But what time did I return?"

"At eleven thirty-one, if you actually did return," I replied.

"And will you kindly glance at my watch?" he asked.

"Great Scott!" I ejaculated. "Yours says 7:38!"

"Assuredly," was his calm response. "I returned from my little jaunt approximately six minutes ago, or at

7:32 a.m. In other words, four hours before I started, and we are now conversing easily although I am in the past four hours while you are in the present, or else I am in the present and you are four hours in the future."

I sank limply upon a settee. "If you keep this up I'll be hopelessly mad, if I'm not already," I gasped. "It's all too involved for me and I believe it's some devilish hallucination anyhow."

"Did you not see me start and return?" he asked.

"The Lord knows," I cried. "One instant your contraption was gone, the next instant it was back. I was nearly blown away by a cyclone. I seemed to be whirled topsy-turvy; I've been temporarily blind, and I *know* it's absolutely preposterous for you to claim that you flew around the earth in one minute."

"Less than that," he corrected me. "You were a trifle confused, I expect, and forgot to look at your watch the moment I arrived. I might add that, for a moment or two, you were partially in the fourth dimension. You inadvertently stepped away from the spot where I posted you. It's a bit lucky you didn't go farther or I might have had trouble in getting you back."

I was too stunned and nonplussed to speak. It was all too thoroughly ridiculous and impossible. Somehow, I was sure that my friend had gone hurtling through space, and yet I could not credit it, and I could not account for my peculiar sensations or why his watch should have leaped back four hours. Still, his explanation could not, I felt, be true.

"Look here, *Don Fenomeno*," I exclaimed at last. "It's utterly prepos-

terous for you to claim you have traveled twenty-four thousand miles in one minute or less, especially when you yourself claim only eleven thousand miles an hour for your machine. That would mean over two hours at the best."

"But my dear sir," he replied. "You forget that you are talking arbitrary time. According to that time absolutely no appreciable period elapsed between my start and my return, whereas, if you wish to argue along the lines of true time, I might point out that I encircled the globe in four hours less than nothing of your time."

"But I don't admit that you have proved you encircled the globe," I persisted.

"Then you are still unconvinced," laughed *Don Fenomeno*. "It is, I think, fortunate that I possess the patience and determination of my Indian ancestors or I should despair of convincing you. But I have an idea. Certainly, if I actually passed through the places I have mentioned, then I should have knowledge of events transpiring there. Let me see. Ah, I have it. When in Barcelona, the most notable occurrence was the tragic death of a famous bullfighter, a matador known as Manuelito, who was killed by an infuriated bull in the arena. That was let me see, at approximately 6 p.m. today. And as I passed through Calcutta a fire was raging on the docks and had spread to vessels moored there. That would have been at about 12:30 tonight."

I laughed. "Of course you can say that," I replied. "But how can you prove that such occurrences took place?"

"Easily enough," he responded.

"We will hurry to the cable office and see what foreign news has arrived. And if my statements are verified, I am sure that even such a doubting Thomas as you, my friend, will be convinced. Most assuredly, you must admit that unless I had actually been at Barcelona and Calcutta I could not have known what was taking place there."

In a few moments we reached the office of the "All America Cables" to find a boy just attaching the latest cabled news to the bulletin board, and as I read the heading of the uppermost sheet, my head fairly reeled and I stood gaping in astonishment. There, unmistakably, was the announcement that as the final bull of the afternoon was about to be killed by the favorite matador, Manuelito, the man had slipped on a pool of blood and had instantly been charged and gored by the infuriated bull.

Doctor Mentiroso's self-satisfied chuckle brought me to my senses.

"Ah!" he exclaimed. "So you do believe I was in Barcelona this evening. If I am not mistaken, my statement regarding Calcutta will also be verified in a moment. Here comes the boy with another sheet."

This time I was scarcely surprised as I read the outstanding news on the latest bulletin, for I had almost expected it, but as I read the account of the disastrous dock fire in Calcutta I had the strange sensation of being in a dream.

"I admit it, now," I muttered, as I turned away. "But I still feel that the thing is impossible and that it must all be a dream. But man! If you really can do these things, you will be the most famous and the richest man on

earth. Why, there is no limit to what you may accomplish. Think what it will mean to commerce, to civilization, to linking the nations of the world together!"

Doctor Mentiroso shook his head and smiled sadly. "I realize all of this," he said with a sigh, "but it is not for me to profit by my discovery. As I said before, I shall keep the matter secret, a secret known only to you and to myself, and to be used solely for my own scientific investigations. And if my beloved country should be threatened by a foe, it can be used as a means of national defense."

"But you are robbing mankind of the most astounding and revolutionary discoveries ever made," I protested. "Surely you could manage to keep the details, the processes of your inventions secret so that Peru's enemies could not construct similar machines."

"That would be impossible," he declared. "Did you ever know of any national secret being kept from an enemy? No, *amigo mio*, only by keeping what I know locked in my own brain can I hope to hold the key to the situation. But I cannot resist the fascinating lure of exploring the mysteries of space and the fourth dimension, and in that way I hope to discover facts which may be used for the benefit of my fellow men."

"What," I asked him, "do you propose to do next? You have proved you can conquer time and space. I shall no more question your statement that you have discovered the fourth dimension, nor shall I doubt that you have harnessed the forces of gravitation. But what more can you do? I can scarcely see what new facts you can discover regarding the elimination of time."

"Ah, there you show the layman's lack of imagination and ignorance of the possibilities of science," he exclaimed. "As yet, my friend, I have but touched the fringe of the unknown. I am like an explorer about to enter a new and unknown land. I have entered the outer fringe of the territory but I have yet to plunge into the mysterious depths before me."

"I confess," I declared, "that I do not get the drift of what you are saying. It seems to me that, as far as exploring is concerned, you might go on flying around the world forever and ever and really find out nothing that you do not already know. Now if you should test your machine for . . ."

"Around the earth!" he ejaculated. "Surely you do not imagine that I intend to confine my observations to circumnavigating the globe! No, it is the realm of space I shall explore. If, by merely traveling around the earth, I can conquer time and travel into the future for an hour or two, just stop and think what it may reveal if I travel through the earth's orbit! Think what discoveries of science I might make by beating our terrestrial globe around the sun. Why, friend, I could gain months, years, where I now gain hours. I could learn the innermost secrets of time, of the past and of the future. I . . ."

I stopped in my tracks and stared at him. "Surely," I cried, "you are not serious in this. You surely do not intend to attempt to leave the earth's atmosphere on any such mad fool's errand."

"Why not?" he replied. "Is it any madder, any more impossible than you thought my statements of an hour or two ago? Yes, my friend, I not only

intend to attempt such a journey, but I start today, this very afternoon, and you, alone of all men, are to witness the first departure of a human being for the uncharted, unknown realms of space."

"And if," I asked, "you should succeed in hurtling your confounded machine through space without killing yourself, when do you expect to return to relate your experiences?"

Doctor Mentiroso was silent for a space, evidently thinking deeply. Then taking a note book and pencil from his pocket he made some rapid calculations.

"If I am correct in my deductions and my apparatus does not fail me, I should be back here in Lima in the early part of the year 1899," was his amazing statement.

"What!" I almost shouted. "You'll be back in 1899! And this is 1926!"

"Of course," he chuckled. "If I can encircle the globe and get back to my starting point four hours before I leave, why shouldn't I tear off through space, follow the earth's orbit around the sun and get back twenty or thirty years before I start? Or if I reverse my direction, why shouldn't I go an equal time into the future?"

"I'll be hanged if I know," I admitted. "But for my part I'd far rather remain in the present."

"But you *will* be present when I leave, won't you?" he begged. "I want some witness so that if I should return in the future or the past, there won't be any question as to when I started."

"I suppose I'll have to," I told him. "But I'm not approving it."

By this time we had returned to Don Fenomeno's house and he was

leading me to the enclosed court with its strange time-defying machine. I was, I think, in a sort of daze, for otherwise I cannot account for my action in countenancing his mad scheme. But the astounding things I had heard and seen had had an almost hypnotic effect, and scarcely realizing what he was about to undertake, I saw him approach the apparatus, draw back the sliding panel and prepare to enter.

"You need not worry over my physical welfare," he remarked. "I've been preparing for this trip, and I am well provisioned, though I do not believe food is essential in the fourth dimension."

"I suppose," I remarked dryly, "that as you are going several years into the past, the food which you ate for the past twenty years or so will serve just as well."

Something of that sort, perhaps," he grinned. "And now, please record the exact time when I leave. Goodbye, *amigo mio*, I will not ask you to await my return, but I'll notify you at once when I'm back. I'll have some very interesting information to impart, I'm sure."

"I could scarcely be expected to wait *back* a score of years," I reminded him, "and I agree with you that if you *do* return, you will most certainly have an abundant mass of interesting information. Personally, though, I feel that both you and your discoveries are lost to science and the world from this moment."

"I'm sorry you won't accompany me," he declared ignoring my caustic remarks. "Well, once more, good friend, *hasta luego*, for this is *au revoir* but not goodbye."

(Continued on page 129)



THE MAN FROM THE MOON

OTIS ADELBERT KLINE

Illustrated by MOREY

*Looking forward is always an interesting occupation, for the imagination can be given absolute free play and so many seemingly fantastic pictures may be called into being. But equally absorbing can be the process of looking backward, though it must be done with considerably less freedom of imagination. What was the origin of races? Did all of us start our generations in similar manner? How far afield of the truth are anthropologists? Otis Adelbert Kline has pondered on these questions and, being a writer of no mean ability, it naturally follows that his story is well worth serious consideration. Therefore we recommend it heartily, knowing that you will agree with us.**

*This is the original blurb used when "Moon" was first published.

We stood on the eastern rim of Crater Mound—my friend Professor Thompson, the noted astrographer, and I. Dusky shadows lengthened and grew more intense in the great, deep basin before us, as the Sun, his face reddened as if from his day's exertions, sank slowly beyond the western rim.

Behind us, Alamo Edwards, the dude wrangler who had brought us out from Canyon Diabolo two weeks before, was dividing his time between the chuck wagon and our outdoor cookstove in the preparation of our evening meal, while our hobbled horses wandered about near-by, searching out clumps of edible vegetation.

"How is the story progressing, Jim?" asked the professor, referring to a half finished novel I had brought out with me to occupy my time with,

while my friend pattered among the stones and rubble in the vicinity.

"I've reached an impasse—" I began.

"And so have I," rejoined my friend dejectedly, "but of the two, mine is far the worst, for yours is in an imaginary situation, while mine is real. You will eventually solve your problem by using your imagination, which has no fixed limitations. I can only solve mine by using my reason, which is limited to deductions from facts. If I do not find sufficient facts either to prove or disprove my theory, what have I? A hypothesis, ludicrously wobbling on one puny leg, neither able to stand erect among established scientific truths nor to fall to dissolution among the mistaken ideas of the past."

"What single, if weak, leg supports your theory that the craters of the

Copyright 1930 by Experimenter Pub. Inc.

moon were caused by meteorites?" I asked.

"You are standing on it," replied the professor. Then, seeing me look around in perplexity, he added: "Crater Mound is the only known Terrestrial formation that exactly resembles in shape the great ring mountains of the moon. If Crater Mound was caused by the impact of a gigantic meteorite with the earth, there is a strong probability that the numerous ringed craters of the moon were created in a like manner."

"But was it?" I asked.

"That is something I can neither prove nor disprove," he replied. "The evidence I have thus far discovered leads me to believe that many relatively small meteoric fragments have fallen here. But they could not have fallen singly, or by twos and threes to make this dent three-quarters of a mile in diameter and more than four hundred feet below the surrounding earth level, to say nothing of throwing up the ring on which we now stand to a mean height of a hundred and fifty feet above the plain."

"Then how could they have fallen?"

"If this great earthen bowl was caused by them, they must have struck this plain in an immense cluster at least a third of a mile in diameter, probably more."

"In that case, what has become of the cluster?"

"Part of it is probably buried beneath the soil. Part of it, exposed to the air, would have been burned to a fine ash, having generated a terrific heat in its passage through the atmosphere and still having, before it cooled, an opportunity to unite with oxygen. There should, however, be an

intermediary residue which I have been unable to find."

"Maybe it was carted off by prehistoric Americans for the metals it contained," I feebly ventured to suggest.

"Improbable as that statement may seem," said the professor, "there is a small amount of evidence in favor of it, for I have found a number of meteoric fragments miles from the rim of the crater. By Jove! We appear to have a visitor!"

He clapped his powerful binoculars to his eyes, and looking in the direction in which they pointed, I saw a tall, bent figure, apparently attired in a robe or gown, leaning on a long staff and carrying a bundle of poles under one arm, slowly descending the slope opposite us.

"Seems to be a Chinese," he said, passing the glasses to me. "What is your opinion?"

I looked and saw an undeniably Mongolian face, with slanting eyes, prominent cheek bones, and a long, thin moustache, the ends of which drooped at least four inches below the chin. The voluminous garments, though badly tattered, were unquestionably Chinese, as was the cap with a button in the center, which surmounted the broad head.

"A Chinaman or an excellent make-up," I replied. "Wonder what he's doing out here in his native costume?"

Our speculations were interrupted by the clarion supper call of Alamo from the camp behind us:

"Come an' get it, or I'll feed it to the coyotes."

"You go down and eat," said the professor. "I'm not hungry, anyway, and I want to stay here and

watch this curious newcomer. Bring me a bacon and egg sandwich and a bottle of coffee when you have finished."

Knowing my friend's disposition—for once he had made up his mind, a fleet of tractors could not drag him from his purpose—I did not argue with him, but descended to the camp.

While Alamo grumbled about dudes that were too interested in rocks to come for their chow while it was hot, I finished my evening meal. Then, taking my binoculars, I carried his light snack to the professor as requested.

The last pink glow of the sun was fading in the west, and the moon was rising when I reached the top of the ridge.

"Sit down here beside me," whispered the professor. "Our visitor seems to be preparing for a religious ceremony of some sort, and I dislike disturbing him."

While my friend munched his sandwich and sipped his coffee, I used my binoculars to watch the Chinaman. He had erected four poles supporting four others which formed a square above a low, flat-topped rock near the center of the crater. Suspended from the horizontal poles by cords were many small objects which were apparently very light in weight, for they stirred like leaves in the breeze. A lighted taper stood in the center of the flat rock, which was surrounded by a ring of thin sticks that had been thrust into the ground. The Oriental was on his knees before the stone, immobile as the rock itself, his face turned in our direction.

"Seems to be keeping his eyes on us," I said.

"I think he is waiting for the moon to rise above the crater rim," replied the professor, once more applying his eyes to his own binoculars.

My friend was right, for as soon as the first shaft of moonlight entered the crater the kneeling figure was galvanized into action.

Bursting into a singsong chant, quite audible, if unintelligible to me, the Celestial applied the flame of the taper to each of the thin sticks he had planted around the stone, all of which were soon glowing like burning punk. Then he stepped beneath one of the objects suspended from a horizontal pole, made a short speech in the direction of the moon, and lighted it with the taper. It burned out in a few seconds, casting a weird, yellow light over the scene. Stepping beneath the next suspended object he made another speech and lighted that object also. This one burned with a blue flame. He continued thus for several minutes until all the dangling objects had been consumed—each with a different colored flame. Then he extinguished the taper and knelt once more before the stone, resuming his chant, and prostrating himself from time to time with his forehead touching the stone. The breeze, blowing in our direction, was laden with the sweet, heavy odor of burning sandalwood and musk.

A half hour passed with no change in the ceremony. Then the burning joss sticks winked out, one by one. When the last went dark, the kneeling man made a final obeisance, then rose, took down his framework of poles, tucked them under his arm, and leaning

heavily on his long staff departed toward the west.

"Show's over," I said. "Shall we go back to camp?"

"Hardly," replied my friend. "I'm going to follow him. In this bright moonlight it should be easy. By Jove! What has become of him? Why the fellow just now disappeared before my eyes!"

"Maybe he fell into a ditch," I hazarded.

"Ditch, fiddlesticks!" snapped the professor. "I've explored every square foot of this crater and know there is no depression of any kind where he was walking."

"Eastern magic," I ventured. "Now you see it, now you don't."

"Rot! You stay here and watch the western slope with your binoculars. I'm going down to investigate."

I watched, while the professor stumbled hastily across the crater and frantically searched the vicinity of the place where he had declared the Celestial had disappeared. After a twenty minute hunt, he gave it up and came back.

"Queer," he panted as he came up beside me. "Deucedly queer. I couldn't find hide nor hair of the fellow—not even the burnt ends of his joss sticks. Must have taken everything with him."

We returned to camp, squatted beside the fire, and lighted our pipes.

Alamo had stacked the dishes, putting off to the last the one camp job he hated—washing them—and was picketing the horses. Suddenly we heard him sing out:

"Well, look who's here! Hello, Charlie. You wantee come along washee dishee, gettee all same plenty much chow?"

Looking up in surprise, I saw the tall, ragged Oriental who had disappeared so mysteriously a few moments before, coming toward us. He was still leaning on his long staff, but minus the poles he had previously carried.

The professor and I both leaped to our feet from places beside the fire.

The Chinaman paused and looked at Alamo in evident bewilderment.

"I beg a thousand pardons," he said in excellent English, "but your speech is quite unintelligible to me."

"Well I'll be damned!" Alamo tilted his broad Stetson to one side and scratched his head in amazement.

By this time my excited friend had reached the side of our Celestial visitor.

"He was only inviting you to sup with us, in the patois of the West," explained the professor.

The Chinaman bowed gravely to Alamo.

"Your magnificent hospitality is duly appreciated," he said, "but I beg to be excused, as I may not partake of food in the presence of the mighty Magong." As he uttered the last word he extended his left hand toward the moon, then touched his forehead as if in salute. There was something majestic about his bearing that made one forget the tattered rags in which he was clad.

"We accept your excuse without question," said the professor, quickly. "Permit me to welcome you to our campfire circle."

Our guest bowed low, moved into the circle of firelight, and laying his staff on the ground, squatted before the fire. Then he took a longstemmed pipe with a small, brass bowl, from one of his capacious sleeves, and the

professor and I both proffered our tobacco pouches.

"I'll use my own, with your indulgence," said our visitor, filling his pipe from a small lacquered box he carried. Before closing the box, he threw a pinch of tobacco into the fire, raised his left hand toward the moon, and muttered a few words unintelligible to me. Then after touching his forehead, he lighted his pipe with the glowing end of a stick from the fire.

After puffing in meditative silence for a few minutes, he said:

"As I have thanksgiving devotions to perform, my time is limited. I will therefore, as briefly as possible, explain the reason for my visit, and convey to you the communication of the great one, whose humble messenger I am.

"Twenty years ago I was a Buddhist priest in T'ainfu. It was expected of every member of our order that at least once during his lifetime he should make a pilgrimage to a certain monastery in Tibet, there to perform mystic rites in a secret sanctuary, where a sacred stone of immemorable antiquity was kept. I made the pilgrimage, fully expecting to return to T'ainfu, as my brother priests had done and take up the duties of my humdrum existence there for the term of my natural life.

"There are things which I may tell you, and things which I may not disclose, so let me explain, briefly, that the whole course of my life was changed when first I viewed the sacred stone. It was graven with mystic characters, similar to, yet unlike Chinese writing. According to tradition, none but a living Buddha could decipher this sacred writing, which might

not be transmitted to any of his followers, however great or wise.

"Now I had, from the days of my youth, made a study of our ancient writings, and had learned the meanings of many characters since wholly obsolete, as well as the former meanings of those whose significance had been entirely changed. I firmly believed, with my fellow priests, that none but the living Buddha might translate the writings on the stone. You may judge, therefore, of my surprise, when I found myself able to translate several of the ideographs graven on its sacred surface. I instantly believed myself the true possessor of the *karma* of Buddha, and that the living Buddha of my order was an impostor. On attempting to translate other characters, I found the majority of them unintelligible to me.

"One of the requirements of my pilgrimage was that I was to spend four hours a day for a period of seven days alone on my knees before the sacred stone. A guard, posted outside the door, saw to it that but one pilgrim was admitted at a time. On the day following, I secreted writing materials in my clothing, and spent the time allotted to me on that day, and the five days following, in carefully copying the writings on the stone.

"I carried my prize away without detection, but did not return to T'ainfu. Instead, I wandered from monastery to monastery, from temple to temple, conversing with the learned men and reading the ancient records to which I, as a pilgrim priest, was usually given access without question. The task of translation, which had at

first appeared easy, took me ten years to complete.

"When it was finished I knew that it had not been written by God, as was supposed, but by the first earthly ancestor of my race, and I found myself charged with a trust which appeared as difficult of fulfillment as the translation itself. The crater which you have been investigating was described to me—yet its location was unknown to the writer. I was charged to find it and to find you. It took me nine years to find the crater, during which time I visited thousands, none of which exactly fitted the description. It took me a year more to find you and to receive the sign."

"May I ask what sign you refer to?" inquired the professor.

"My illustrious ancestor, who charged me with the task of conveying his message to you, said in the writing that his spirit would be watching me from Magong. He prophesied that you would appear at this place, and when you did, he would flash a brilliant signal to me from his Celestial abode."

"And you have seen the signal?"

"I have and do, for it is still visible. Look!" He pointed toward the full moon.

The professor looked, then raised his binoculars to his eyes and focused them.

"By Jove!" he exclaimed. "You have unusually sharp eyes. There is a brilliant, star-like light in the crater, Aristarchus. A rare occurrence, too."

"I have studied Magong for many years," replied our guest, "and have trained my eyes to see things hidden from the sight of ordinary mortals. I

could have used a telescope or binoculars, but for my purpose I have no need of them."

"Remarkable!" commented the professor. "And this light fulfills the prophecy?"

"To the letter. Permit me to deliver my message, therefore, and depart, for I have much to do before Magong veils her face once more."

Drawing a large, bulky envelope from his pocket, the Oriental arose and handed it to the professor with a profound bow.

Springing to his feet with alacrity, the professor accepted it with a bow as low and dignified as that of the donor.

"Man of science," said our guest. "Use this message as you will, for that is your privilege, but you will confer a favor on the illustrious sender and bring manifold blessings on yourself and your descendants if you will use it to advance the knowledge of mankind."

"I will endeavor to use it as you ask," replied the professor, "and thank you for it, and for the trust you have placed in me."

"Do not thank me," was the answer, accompanied by a significant gesture skyward. "Thank P'an-ku."

"I will, and do. May we not have the pleasure of your company tomorrow?"

"A thousand thanks, and as many regrets, but my task will have ended when Magong veils her face, and I am weary and would return to T'ainfu. So farewell."

He took up his staff, and without a further word, stalked majestically out into the moonlight. The last we saw of him was when his tall, gaunt

figure was silhouetted against the sky for a moment on the crater rim.

With trembling fingers the professor broke the seal of the envelope and drew therefrom a neatly written manuscript. It was in English, and he read it aloud to me, while Alamo snored lustily from the folds of his blanket, several yards away.

With Professor Thompson's permission, I publish it here for the first time, making it clear at the outset, that while it seems to explain many matters which have puzzled our leading scientists for hundreds of years and is not, in the light of our present knowledge, either susceptible of proof or refutation, we cannot vouch for its veracity.

The Story of P'an-ku

Having attained the advanced age of two hundred and ninety-eight earthly years, and feeling the hands of San-miau, the devourer, grim messenger of the Supreme God, T'ien, ever closing tighter on my throat, slowly squeezing out my soul from this old shell of a body, I, P'an-ku, lord of thousands, founder of a new race, and last survivor of an old, have retired from my manifold duties and pleasures—the ordering of the affairs of my subjects, the company of my wives, my children, and my children's children, who will someday be numerous as the stars of heaven—to write this history of my own people for those to come who will have the intelligence and the desire to understand it.

For a million historical years, men of my race inhabited Magong when she was yet a planet among planets, a free, rotating sphere with her own undis-

turbed orbit, midway between the orbits of this planet and that of the terrible, devastating war-world, Mars. For a half of those million historical years, an ancestor of mine—a P'an-ku—sat on the imperial throne of Magong and held dominion over all her lands and seas.

When I was born, Crown Prince of Magong, my people had reached an advanced state of civilization, for much can be accomplished in a million historical years. For more than ten thousand years, Magong had been in communication with Mars, the only other planet inhabited by intelligent beings. For over five thousand years, our interplanetary ships had visited their planet, and their ships had made friendly calls on Magong, carrying passengers, manufactured merchandise, and raw materials. A colony of their pale, white people, whose faces I wish we had never seen, was founded on one of our continents and treated with every friendly consideration by our rulers: that is, my ancestors. A colony of our stalwart yellow people had also settled on Mars and had been received with every appearance of good will.

Before I was sixteen years of age I had learned to navigate an ether ship, and when I had demonstrated to my father's satisfaction that I was a thorough master of interplanetary navigation, he permitted me a leave of absence of two years for the purpose of visiting the inner planets—Earth, Venus and Mercury. This trip was mostly for my own education, as all three of the planets had been explored thousands of years before, and had subsequently been visited at regular intervals by our scientific expedi-

tions for the purpose of tabulating the evolutionary changes taking place on them. Mercury had developed nothing but the most lowly vegetable organisms. Venus teemed with life, ranging from the microscopic, unicellular animalcules to gigantic, four-footed reptiles, which roamed through her great forests of fern and fungi, some of them feeding on these and other primordial thallophytic growths, some preying on these herbivora or on the lesser creatures coexistent with them on that planet. Some of them had evolved membranous wings with which they flapped clumsily from place to place, but there were no birds or mammals. Among the plants, none flowered or bore fruit or seeds. All reproduced by spores or spawn or by simple fission.

On the Earth, a higher order of evolution was in progress. Many of the plants, having developed specialized sexual organs, flowered and bore fruit. Birds forsook the ways and forms of their reptilian ancestors—evolved a thousand shapes and hues—cultivated glorious plumage and melodious voices. Mammals suckled and reared their young, and man, the greatest mammal of them all, was slowly battling his way to world supremacy with crude weapons and implements of wood and stone.

On my return to Magong, after visiting the inner planets, I importuned my father to permit me to visit Jupiter. This he flatly refused to do. The trip, he said, was too long and dangerous for one of my years. Furthermore, only one, out of a thousand of our most skillful and experienced navigators, who had attempted the trip, had returned to tell of it. I had to be content, therefore, with several trips

to Mars, where I, as Crown Prince of Magong, was always received with such pomp and splendor that I wished I might be permitted to go incognito and mingle with the common people—but even this small pleasure was denied me.

At twenty-five, I was made commander-in-chief of Magong's interplanetary navies. Shortly thereafter, trouble developed between my father and Lido Kan, Supreme Ruler of Mars. It seems that a number of Martians, jealous of the economic progress made by our colonists on that planet, had gone to Lido Kan with tales of woe, insisting that they be deported. So strong was the pressure they brought to bear on him, that he finally took the matter up with my father. The reply of my father was courteous, but firm. He insisted that if his people were to be deported from Mars, the Martian colony must also leave Magong. Lido Kan argued that his people had created no disturbance on Magong, and no dissension among the subjects of my father, which was true enough, and my father naturally retorted that his subjects were too courteous to even think of bringing up such a matter.

One word led to another, and things went from bad to worse, until a group of Martians attacked and massacred the inhabitants of one of our settlements. My father instantly demanded an imperial apology from Lido Kan, complete punishment of the perpetrators of the crime, and indemnity for relatives of all the massacred people. Lido Kan delayed his reply for several days, but was eventually swayed by the jingoists of his realm, and replied that he would neither apologize, pay indem-

nity, nor punish any of his subjects, as my father had received fair and timely warning. While my father debated what to do in this crisis—for he had always been a man of peace—word came that an army of Martians had completely wiped out our colonies on that planet.

A short time thereafter, the commander of one of our large interplanetary passenger ships ether-waved me that the Martians would not permit him to leave port, and that several hundred of our ships were being held in a similar fashion. I immediately left Magong with a fleet of battleships, intending to demand their release or fight, but was met half way by a fleet of Martian warships.

The contest that ensued was short and disastrous. My fleet Used the cold, energy-decreasing green ray of condensation, which we had developed—the enemy fleet, the hot, energy-increasing red ray of dispersion. We had developed our inter-rotating green rays to such a degree that any substance touched by them would contract to less than one-hundredth of its normal size with a corresponding increase in density. The toughest metals, under this ray, would become as brittle as egg shells and more dense than pure lead.

The effect of the red rays of the Martians was the opposite, but fully as devastating, as these rays, rotating in receding spirals, tore the atoms apart on contact, making the heaviest metals less dense than the atmosphere in an instant. When a green ray met a red ray of equal intensity, they neutralized each other.

By superior maneuvering, I managed to wipe out the last Martian battle-

ship when I had lost all but the flagship of my fleet. This had been badly crippled by a red ray, and after making temporary repairs, I limped sadly back to port.

On the face of my father, when I reported to him in the throne room that day, was a look, sterner than any I had ever seen him wear.

"My son," he said. "War is a terrible thing—the worst affliction that can come to humanity—but it is at hand and we must meet it like men. The Martians have made a start by wiping out our colonies and attacking our fleet. Now they are determined to eliminate us entirely from the solar system. At this very hour they are preparing to use their most terrific weapon of all against us."

"What weapon is that, O my father?" I asked.

"Come with me, my son, and I will show you."

He led me up to the great observatory on top of his palace. We passed through the general observation room, where a hundred enormous telescopes were in constant use—a thousand trained men observing, recording, and manipulating the instruments. Going into his private observation room, my father himself trained his huge telescope on a distant object. Then he called me to look. I saw what appeared to be a huge spiral of nebulous matter forming near Mars.

"They are clearing the interplanetary lanes for the passage of a huge fleet," I said. "See, they are collecting all the meteoric bodies for millions of miles in all directions."

"They are doing more than that, my son," my father replied. "That matter-condensing and projecting ap-

paratus which they formerly used to clear the way for peaceful ships is going to be used for a horribly deadly purpose. Have you noticed *where* they are condensing the meteoric mass?"

"It seems to be on a line between Magong and Mars," I replied.

"It is. Have they ever condensed material in that position before? You know full well they have not. They have always concentrated it in a position where it could be projected out into space without harm to anyone."

"Why, Father, what do you mean?"

"I mean that as soon as that synthetic nebula reaches a sufficient degree of cohesion and solidity it will be projected at us!"

"What will it do? Will it burst our planet asunder? will everyone be killed?"

"No. It is not large enough for that, but it can do incalculable damage, and if their aim is good and they are not stopped in some way, they can collect enough of such matter from the meteoric belts of the solar system to depopulate this planet."

"Can't we dodge them? What about the new gravity control plant?"

"The thing is still in the experimental stage. Besides, it is a terrible and a dangerous thing to disturb or attempt to change the orbit of Magong. Every body in the solar system is in perfect balance with every other body, and too great a change, even in the orbit of our own relatively small planet, may cause untold damage—some upset of the scheme of things, which we cannot possibly foresee. True, we have slightly perturbed the motion of Magong, just as an experiment, but it has been done cautiously, and always with a counter-perturbation sufficient to bring it back

to the proper place in its orbit."

Once more my father looked through the giant telescope.

"The projectile is formed and on the way," he said gravely. "Where it will strike, no one can tell—not even those who are sending it. It may crush this palace, destroy this city. It may kill nobody or wipe out a million people. It may miss Magong entirely, but this is not probable. We are too large a target. Let us go below. There is nothing more we can learn here at present. I will show you the only efficient aggressive weapon to which I can turn at present. By this, and by the remaining interplanetary fleets under your command, the question of our very existence will be determined."

We descended to the main floor and entered a compression tube car, in which we were shot to one of the numerous physics laboratory stations of Magong. My father presented Wang Ho, the venerable chief scientist of the institution.

"Wang Ho," he said, "Is the atmosphere disintegration ray ready?"

"It is ready, your majesty," was the reply.

"Then train it on Mars. They insist on war, so we will give it to them in earnest. They are determined to destroy the face of our planet, therefore let us remove the atmosphere from theirs."

"Your majesty is aware, I hope, that a continuous use of this ray will be suicidal. For every ten cubic parsads of their atmosphere we send out into space, we also send out one cubic parsad of our own. If your majesty would wait, and have a number of these ray projectors made in portable size, they could be fastened to ether

ships and used without destroying our own atmosphere."

"Unfortunately," replied my father, "we cannot wait. The war is on. It may be decided in a few days. Several weeks would be required to fit out ether ships with these ray projectors. No, we must fight now, or be forever beaten. Turn the ray on them, and keep it going as long as they are in range. Our other projecting stations will take up the duty, one by one, as the planet revolves on its axis."

He turned to me.

"My son," he said. "The entire war fleet of Magong is in your keeping. Save the fleet if you can, yourself with it, but remember—it is only a barrier. It is one of the protections of Magong. If the barrier must be destroyed in the line of duty—then do not attempt to save it at the cost of that which it was set up to protect. Do you understand?"

"Fully, father. I will be wary and circumspect, but I will not fail in the line of duty."

Once more we entered the compression tube and were shot back to the imperial palace. After bidding farewell to my mother, I said a last goodbye to my father, and went out to my flagship. There were tears in the eyes of my mother as she called her last farewell to me. My father was too much of a man of iron, however, to betray his emotion at such a time.

My fleet of ten thousand other ships was ready for action, awaiting only my word of command. I had formed a daring plan which, if successful, might mean the destruction of the fleet and my own death, but would

make it possible for Magong to win the war.

Leaving half of my ships to guard the planet against enemy craft, I took the other half and made straight for Mars. Shortly after we started, the first huge missile of the Martians passed us, and a few minutes thereafter it struck Magong with a brilliant flare of light, leaving a great dark pit in the ground where it had fallen. Referring to my charts I found that it had alighted on a small village of about two hundred souls. What a sudden and terrible end for them!

As we pressed onward, I saw another large nebula spiraling into shape, and knew that it would not be long until a second projectile was on the way to Magong.

Presently I saw a huge enemy fleet put out from Mars, evidently with the intention of meeting and giving battle to my fleet. This did not fit in with my plans at all, so I immediately gave secret orders to all of my commanders, then bade them disperse.

There were nearly a thousand magnetic wave stations on Mars, most of which were in continuous use because of the terrific efforts the Martians were putting forth to crush Magong. These stations were sending out powerful, man-directed magnetic lines of force, which drew all relatively small particles of matter, with which they came in contact toward the stations from which they were projected. This procedure would have been dangerous to the Martians themselves had they not been clever enough to cross the lines of force and form contracting vortices, hundreds of thousands of miles from their planet. Under the direction of the central station, these vortices were

combined and recombined at regular intervals, until visible nebulae resulted. The nebulae were condensed by extra and special lines of force from the central station, then projected at Magong, close-knit, spherical clusters of stone and metal. When the central station was turned away from the target by the axial rotation of the planet, a duplicate-control station on the other side carried on the work under the control of the same operators.

During the progress of my ship toward Mars, six of these huge clusters were projected at my world. Five of them struck the target and one missed, to shoot out into space and become an asteroid with an orbit of its own around the sun.

My plan was simple and direct. Each of my ships carried a chart, showing the location of the thousand enemy wave stations. Each station was numbered, and five ships were assigned to the attack of each.

My ship, together with four others of the most powerful of my navy, each carrying a battery of twenty huge ray projectors, were to attack the central magnetic station.

While we neared Mars I watched the movements of the enemy fleet, and saw that it was heading straight for Magong, evidently pleased at the fact that my first fleet had dispersed. This exactly suited my plans, as I knew that Hia Ku, my able lieutenant, would give them a warm reception with the five thousand ships I had left under his command, and I would be free to carry out my attack.

When I drew near the central wave station of the Martians I saw that my other four ships had arrived on schedule, and ordered the attack. We

were discovered almost instantly, and a thousand red rays were flashed at us, but we were able to neutralize these by laying down a barrage of green rays. Then a number of Martian ether ships, reserved to guard the central station, arose and attacked us from above. One of their rays pierced our upper barrage and one of our ships, with her controls destroyed, plunged dizzily groundward, but was disintegrated by the red rays before she had fallen half way.

With this ship gone my barrage was weakened, and I knew that it would only be a matter of minutes until we should all meet a like fate. As certain death faced us, I thought quickly, and as quickly gave orders, resolving that in our passing we should at least cripple the central wave station of the enemy. My ships instantly responded to my command, and in a moment all were plunging directly downward, temporarily protected above and below by our green ray barrage—our objective the glass dome of the central wave station. It was my hope that when we crashed through this dome to our death we might destroy, or at least cripple the central wave station of the enemy. My ships instantly responded to my command, and in a moment all were plunging directly downward, temporarily protected above and below by our green ray barrage—our objective the glass dome of the central wave station. It was my hope that when we crashed through this dome to our death we might destroy, or at least cripple this station, and thus hamper the Martians and give my father the time he needed to fit out other ships with atmosphere

destroyers, thus assuring the victory of Magong.

But the Martians were too wise for me. They must have suddenly focused their lines of magnetic force on our ships, forming a contracting vortex a short distance above the dome, for we lost control of all of them simultaneously. They revolved about each other for a moment, and then crashed together. With that crash I lost consciousness. . . .

When I recovered my senses once more, I was lying on a metal bench to which my hands and feet had been bound. Standing over me with a sneering smile on his pale face was Lido Kan, Supreme Ruler of Mars.

"What happened?" I asked, bewildered. "Where are my men?"

"All died but you," he replied, "when we brought your ships to the ground. I had thought to bring them down gently, but the rage of my operator got the better of him, and he wrecked all four. I cannot understand how it happened that you lived through that crash. It was a miraculous escape."

"Perhaps I have been saved for a purpose," I replied. "The Supreme Ruler of the Universe is all-knowing."

"I, at least, have kept you for a purpose," replied Lido Kan, savagely. "Lying here on your back, you shall witness the destruction of your world." He pressed a lever and curved metal plate slid back from the ceiling, disclosing a great, dome-like lens which looked out into space. "The empire of P'an-ku is doomed," he continued. "While this side of our planet is turned toward Magong, you shall witness its destruction through this lens. As soon as we turn away

the lens will become a mirror which will give you the battle scenes as witnessed from our station on the other side. I pride myself that this is a rather clever invention of mine."

I made no reply, but looked eagerly out toward Magong. Already the once fair face of my planet was growing pock-marked and ugly from the cruel disease called war.

"You are a clever whelp," continued my captor, watching my features closely, "but not clever enough for Lido Kan. Your ships destroyed two hundred of my magnetic wave stations, but it will not take long to rebuild them, and in the meantime the others are functioning quite successfully, as you will observe. At least half of the population of Magong has already been destroyed by my projectiles."

"Don't be too sure of victory," I replied. "By the time you have destroyed Magong, you may find yourself without an atmosphere."

"Hardly. It will take many days for your father to destroy our atmosphere. One week is all I require to silence all of his ray projectors and exterminate his people. But enough of this idle talk. I must to the grim work before me. I leave you to the pleasant contemplation of the dissolution of your heritage—the empire of Magong."

Left quite alone in the small, bare observatory room, I lay on my back and watched the progress of the battle. High above me the Martians were forming an enormous cluster of meteoric material. Already it was at least ten times as large as any they had projected at Magong, and they continued to add to it. Presently I saw that it was ready to be projected.

There was a terrific roar from the machinery in the building around me, and the huge globe shot outward, but not in the direction of Magong. It described a short curve and began to fall directly upon Mars. Once more there was a roar from the projector machinery, and once again the sphere shot outward, only to return, drawn by the terrific pull of Mars' gravity on its great mass.

A feeling of exultation came over me, as I saw that my enemies failed, again and again, in their efforts to project the sphere. It appeared to me that they had brought destruction on their own heads. But Lido Kan was not without resource. Suddenly I heard a more terrific roar from the machinery than had occurred before. A great section was split from the mighty sphere, and simultaneously the larger and smaller pieces were projected obliquely out into space. This time they did not fall back, but continued to travel in curved paths. The smaller, moving much more swiftly than the larger, soon disappeared from view, but it reappeared again in a few hours. The larger, moving more majestically across the sky, appeared to travel in a direction opposite to that taken by the smaller, because of its slower motion and the axial rotation of the planet. I had witnessed the formation of the moons of Mars.

Foiled in his attempt to hurl so huge a projectile, Lido Kan once more turned his attention to the firing of smaller ones. Hour after hour I watched, my lens presently turning to a mirror as Mars turned her face away from Magong, and each hour added to my sorrow as I saw the surface of my planet turning to enormous ringed

pits. Presently an attendant brought me food and drink. Afterward, I slept at fitful intervals.

Days passed, and I detected new tactics on the part of my father. He evidently decided to risk all in an attempt to dodge the projectiles, for I saw that Magong was shifting out of her orbit—moving in closer to the sun in an eccentric fashion that would make it difficult for an operator to properly aim and time a projectile intended to strike her.

Soon I saw that he had moved into the orbit of Earth, then beyond it, between the orbits of Earth and Venus. At first I could not fathom his plans, but gradually they dawned on me, as I saw Earth come along and Magong fall in behind her. It was his intention, I felt sure, to use the larger planet as a shield against the devastating Martian projectiles.

Something must have gone wrong with his control station, however, for Magong presently fell behind the Earth in her race around the sun, then rose, crossing her orbit behind her and hurried forward to catch her once more—this time outside Earth's orbit, between Earth and Mars. Something, also, had happened to Magong's rotation on her axis. Whereas she had previously revolved once in every twelve hours, she now turned with exceeding slowness. Rushing on past Earth she continued for some distance, then paused and fell back once more to wait for the larger planet. Magong, I could clearly see, was caught in the gravity net of Earth. Thus she had become a satellite of the planet, even as the huge broken projectile of Lido Kan had become two satellites of Mars.

Lido Kan kept up his pitiless bom-

bardment of Magong, once he had grown accustomed to her new orbit, with deadly accuracy. Once, and once only did I see him miss, the projectile, which was a relatively small one, passing Magong and striking somewhere on the planet Earth—I could not tell just where because of the silvery cloud envelope that hid her survice from view.

Although fully four-fifths of her population must have been wiped out by this time, I knew that Magong still kept up the fight, as the atmosphere in my room grew rarer each day until breathing was a painful effort.

One day Lido Kan entered my room. Strapped to his back was an apparatus containing concentrated air, from which he took mouthfuls from time to time.

"I come to take leave of you, young whelp of P'an-ku," he said. "My people are dying by the millions for want of air, thanks to the infernal rays which your father has managed to keep trained on us. Our dissipated atmosphere cannot be brought back, nor could we manufacture a new one, from the elements locked in the soil, in less than a thousand years. I am leaving, therefore, with the five hundred large ether ships I still possess, for the purpose of colonizing the damp, unhealthful and savage planet, Earth. My wave projecting stations, I will leave manned, each being provided with a supply of concentrated air, and committed to the task of continuing the bombardment of Magong until death overtakes them.

"I will have one of your hands unfettered, and will leave you plenty of food and water so that when

death finally overtakes you, you will be slain by your own father, as he continues to dissipate our atmosphere. And so farewell."

He went out, and shortly thereafter, my attendant came in, placed a tank of water and a large basket of food within reach, and unfettered one of my hands. Then he, too, went out, and I was left alone, gasping for breath, as the atmosphere continued to grow more rare.

Presently I saw the fleet of Lido Kan set out. Instantly, with the thin point of one of my eating sticks, I set about picking the locks of my fetters. Within an hour I had freed myself. Finding my door unlocked I rushed from the room. Presently I blundered into the great deserted room from which the official Martian ether visiphone messages had formerly been sent to Magong. Opening a switch, I found that the power was still on, and signaled the station of my father. My heart gave a leap of joy when his face suddenly appeared in the disc before me.

"Have you any ether ships left?" I asked him, after we had exchanged greetings.

"Not quite a thousand."

"And does Hia Ku still live?"

"He lives, and commands the fleet during your absence."

"Then dispatch him at once to find and destroy the fleet of Lido Kan, who has just left here with five hundred ships, purposing to colonize Earth."

"Then the atmosphere is nearly dissipated?"

"It is."

"But what about your my son?"

Are there any ships left in which you can return?"

"There are none near-by, and I have not the strength left to go out and search for more. My death is only a matter of hours, and I am resigned to my fate."

"Do not despair, for I, your father, will save you. I will shut off the atmosphere-destroying rays at once, and will have a small, swift ship there to bring you back in less than four hours."

I returned to the room where I had been imprisoned, to watch for the ether ship, and true to the word of my father it appeared in less than four hours—a tiny, one-man craft. I hurried to the roof, reaching it just as the ship alighted. A man stepped out—an old and faithful servant of my father.

"The ship from His Majesty, your father, Highness," he said.

"But why a one-man craft?" I asked.

"Hia Ku took all the others when he left to attack the fleet of Lido Kan," he replied. Then, before I could prevent him, he took a small, green ray projector from his belt and pressed the muzzle to his abdomen. With a gasping "Farewell, Highness," the brave and loyal fellow dropped dead at my feet.

Hurrying below once more, I entered the ether visiphone room and signaled my father. His face appeared in the disc. I told him what his messenger had done, and tears streamed from his eyes.

"Just another sacrifice to the rapacity of Lido Kan," he said. "Get into your craft now, and I'll turn on the rays once more."

I lost no time in getting back to the little craft and away from Mars. I was making swift progress toward Magong, when suddenly I happened on the remnants of the two battle fleets. There were only three of our ships left, and they were beleaguered by four enemy craft. Both flagships were still intact, and at the time, dueling with their enormous ray projectors—green against red. As I approached them, one of our ships was cut in two by a red ray, the halves hurtling out through space.

I had one small ray projector on my forward deck—a puny weapon indeed against those of the huge battle ships, but I determined to enter the unequal contest. Selecting the helmsman's turret of the nearest enemy ship, I plunged toward it. My approach in the tiny craft was apparently unperceived, and I did not turn on my green ray until within less than a thousand feet of my target. When the ray struck it, the turret instantly collapsed, and the ship, out of control, swung broadside scattering her ray barrage and leaving her hull unprotected. I instantly turned the nose of my craft upward and passed over her,

Without pausing to give the enemy a chance to understand just what had happened, I quickly plunged at the helmsman's turret of the next ship. Once again my tiny ray threw a mighty ship out of control, and it was destroyed by the green rays of Hia Ku. This time, however, I did not escape unscathed, for one of the red rays of the second ship, shooting wildly upward as she went out of

control, had carried off part of my forward deck.

I tried to close the safety plate beneath my instrument board, to keep my air and warmth from escaping into outer space, but it stuck, and a cold that closely approached absolute zero swept over me. With numbed hands I pulled frantically at the recalcitrant plate, and in a moment more had it in place. In the meantime, however, my small, swift craft had hurtled away uncontrolled to a position nearly a thousand miles from the four remaining combatants.

I swung her to, and steered for the battle scene once more. Then I saw something which wrung a gasp of horror from my lips—a huge meteor cluster from Mars, rushing straight at the four ships. I had no time to signal them—to do anything, in fact. A moment later it struck them, and all four combatants disappeared in a blinding flash of light without appearing to have had the slightest effect either on the path or the mass of the projectile.

With a heavy heart, I turned my ship toward Magong. A short time after, I saw the projectile strike. There was a small chart on board, and on referring to it, I found that it had destroyed one of our atmosphere disintegrating ray stations.

A two-hour run took me to Magong, during which time, four more enormous projectiles hurtled past me on their death-dealing errands. As I steered toward the palace of my father a fifth shot past me, hurling my tiny craft through the thin atmosphere like a leaf caught in a whirlwind. When I succeeded in righting it, and looking downward once more, a chill

of horror crept over me, for this last messenger of death had dug a huge pit more than sixty miles in diameter, and the center of the pit marked the spot where my father's palace had stood. My beloved parents were no more. P'an-ku, the mighty monarch, was dead. I was P'an-ku, ruler of a desolate waste that had once been the mighty, flourishing empire of Magong.

I alighted near the rim of the enormous crater and stepped out of my craft. A moment later, gasping for breath, I hastily sprang back inside and closed the door. The atmosphere of Magong was nearly gone. With her huge ray projectors still going, she was committing suicide in order that her hated enemy might be destroyed.

Rising, I made for the nearest ray projector station. Circling close to it, I peered in the windows. Not a living soul greeted my gaze, but there were many dead bodies on the floors. The projectors, however, were still working—pointed by machinery set to keep their rays on Mars until they should fail to function for lack of power.

An occasional meteor cluster struck Magong from time to time, but they grew smaller and fewer in number—a sure sign that their projectors were succumbing, one by one, to the death-dealing rays our people had left trained on their planet. Rising, I made for the nearest world which would support human life—Earth. It was a good two hours' journey, and I noted with alarm that I only had a small supply of concentrated air in my tank—enough to last me about forty-five minutes by using it judiciously.

Pressing my speed control lever to the highest notch, I rushed Earthward

with super-meteoric swiftness. Forty-five minutes passed, and still the Earth, although looming big ahead of me, was many thousands of miles away. Glancing at the indicator on my air tank, I saw that it registered zero. I closed my foul air escape valves, and breathed as lightly as possible. Presently I felt a deadly lethargy creeping over me. By exerting my will power to the utmost I managed to retain control of my senses for a few minutes longer.

Suddenly my waning consciousness registered the fact that my instruments showed I had nearly reached the outer limit of the Earth's atmosphere. To have entered it at the speed at which I was traveling would have meant a sudden, flaming death. Two things I managed to do before my senses fled—set my control lever at low speed, and unfasten the door beside me. Then came oblivion.

When I regained consciousness I was lying on the earthen floor of a large, mud-walled hut. Standing around me was an awe-stricken group of light-skinned, half naked savages. I sat up, and as I did so, the earth shook beneath me and a portion of the mud wall collapsed, crushing three men and a woman. The remainder of the savages prostrated themselves around me with every indication of superstitious fear.

I signed that I was hungry, and food and drink were instantly brought me—a huge chunk of scorched meat and a white sour beverage which I afterward learned was the fermented milk of some animal. I ate and drank, and feeling stronger, arose and stepped out of the hut, walking as if my body

had been weighted with lead because of the planet's tremendous gravitational pull. As I did so, the earth quivered once more, and the hut collapsed completely.

By signs, I finally made the terror-stricken savages understand that I wished to know the whereabouts of my ether ship. One of them, who appeared bolder than the rest, led me to a place where an enormous fissure yawned in the hard ground. Far down in this fissure I saw the craft wedged. I was casting about for some means of rescuing it, when the earth trembled, and the crack closed over it.

Thus cut off from interplanetary travel—for I did not know how to construct another ether ship—I found myself earthbound. I immediately set about learning the simple language of the savages, living in a dwelling of skins tied to light poles, because of the frequent earthquake shocks. These, as well as the many volcanic eruptions, terrific electrical storms, meteoric showers and electromagnetic displays from the polar regions, I knew were the results of the recent constant proximity of Magong to Earth, and that things would, in time, reach their proper balance once more. The savages, however, believed that the coming of "The great night light" and the subsequent terrifying phenomena, were due to some magic power which I possessed, and I was consequently worshipped as a god.

Propitiatory offerings of food, flocks and animal skins poured in to me from neighboring tribes for hundreds of miles in all directions. Gradually the earthquake shocks subsided, the volcanic eruptions ceased to be continuous, the meteoric showers grew less

frequent, and the elements less destructive. After a year had passed I married a daughter of the chief of the tribe among which I had fallen. Other chieftains, learning that the god married women, quickly tendered the hands of their daughters.

One of these, I married from time to time, thus making alliances with tribe after tribe which none might wish to break. I grew immensely wealthy, as the wealth of these people was reckoned; and built me an immense palace of hewn stone, personally supervising the work of my horde of unskilled laborers. I also built a temple for the worship of the great god, T'ien, Supreme Ruler of the Universe, and taught my people to worship Him, and to regard me only as His earthly vicar.

Most of my numerous wives bore me children, and I was grateful for the fact that all of them, instead of resembling their mothers' people, had the yellow skins, straight black hair, and slanting eyes of my race. My children grew up and married savage women and men, yet there was slight modification in the physiognomy of their offspring. As the years passed, I learned that these people, my children and descendants included, rarely lived longer than a century, their average life span being about seventy years. When I passed the century mark without showing any signs of senility, it was noised about that I was an immortal. This belief increased my power, and consequently I neither denied nor affirmed its truth, although I knew I should be middle-aged at two hundred and would probably be dead before I had traveled far in my third century of my existence, as three cen-

turies was the average life span for my race, and a total of four centuries rarely attained.

Having now reached my two hundred and ninety-eight year, I am ready to return to my maker, leaving a hundred thousand descendants—a proud race who have long since ceased to intermarry with the white-skinned savages. They are known as the Celestial People, and I have made them lords over the lesser races of my mighty empire.

This record, which I have graven on age-defying stone with my own hands, will be sealed in the cave in which I am cutting it. I have calculated that, not less than five thousand years hence, the door of the cave will be revealed by erosion.

As the end approaches I feel the gift of prevision—the urge to prophesy. When my message is found, my descendants will be numbered by millions. They will not be scientists, but religionists. I see this tendency persisting in them, up to this day, and it will continue. Although I have taught them to read and write the language of my people, and to worship T'ien, I have long since abandoned the attempt to teach them science. My every effort to get them to grasp even the rudiments of astronomy and physics was unavailing. My simplest statements along these lines were interpreted as symbolic religious utterances and wound around superstitious beliefs.

The pure language of my forefathers, together with the characters I have taught them, is undergoing a gradual change. It may be that, five thousand years hence, this writing will be unintelligible to my descend-

(Continued on page 130)



BEYOND THE PLANETOIDS

EDWIN K. SLOAT

Illustrated by MOREY

Manned by a handful of ex-hostages, the intrepid Death Head, her pirate crew destroyed by voracious lizard mice, is herself the weapon used by her "crew" to repulse the attack of another, vastly more powerful, ship of villainy!

TOM BASIL stirred feebly at the heavy kick in his ribs. A second kick brought him out of the merciful oblivion of sleep with a groan. "Up and out of that, you blasted Earthling!"

At the sound of the harsh voice he opened his eyes to see the evil Martian countenance of the mate, Xabbus, sneering down at him. This wasn't the safe, old *Polaris*, but the prison well of Corvus' pirate ship! He must move, or that beast of a Xabbus would kick him again. He started. Too late! The mate's heavy, clumsy boot, with its artificial gravity plate, sunk deep in his side. In agony Basil staggered on his feet, fighting back a cry of agony. Xabbus' lips twisted in a grin of pleasure.

"I thought you'd move. Out with you! Corvus says to give all of you air. It's healthy salves and not corpses

we want for the auction block on Pluto! Move!"

Basil shut his lips the tighter as he gripped the steel ladder rungs. All the other prisoners had already left the prison well. Slaves for the auction block! If Corvus ever guessed his mission, there would be no auction block for him, but instead the pirate ship torture chamber with its electric grill, its amorphite drug, and the psycho-disintegrator that wrenches the secrets from the bottom of a man's mind and leaves him a babbling idiot ever after, if it does not mercifully kill him. Basil clenched his teeth and climbed silently to the deck above. He was glad his face was so badly bruised. Perhaps they would pay less attention to him, and give him a chance to escape—if such a thing was possible out here in space.

Out of the door and down to the

fighting deck of the pirate craft he stepped, scarcely glancing at the long row of the great ray cannon with their complicated breeches that stretched away on either hand. He was staring at two men who stood beside the open air lock through which a chill wind was whipping into the ship.

That smaller man must be Corvus himself. Too often had Basil seen pictures of the pale, slender pirate with the glittering agate eyes not to recognize him now as he stood beside the open air lock, stiffly erect, as was his habit, with a pair of heavy ray pistols holstered at his belt, and his austere features and somber tunic contrasting so strangely with the gaudy finery of his companion.

As Basil approached Corvus, he knew those bleak, agate eyes were upon him, and he strove to mask a natural uneasiness under an air of dejection and indifference. He was about to step out through the air lock door when Corvus' companion, a gigantic mate, put out his hand and stopped him. Slowly he turned Basil about, while the three studied him sloely. Corvus addresses Xabbus.

"Is this the last one?" he asked in a cold, metallic voice.

"Aye, aye, Sirro," answered Xabbus smartly. "You have already seen the others."

Again the agate eyes studied Basil.

"This man doesn't answer the description any more than the others did," observed Corvus coldly. "My informant told me to watch for a slender, studious youth with glasses and stooping shoulders. This man is far too broad-shouldered and husky to fill the description. I'll have to check up on my information again."

A stoop-shouldered youth! Near panic seized Basil. They were on his trail after all, for the youth they referred to was his own brother, Will, whose scholarly, thin-chested appearance had been decided upon as his best protection for the carrying of the secret. Then at the last minute Will had suffered one of his chronic attacks of indigestion, and Tom—himself—had taken his place, barely catching the ancient *Polaris* as she was leaving the New York launching port.

It meant but one thing. Corvus had somehow gotten wind of the fact that the legendary coronium mine on one of Jupiter's satellites had actually been found, and the sale of it to the Basil interests was pending. He must be trying to learn the location of the mine, either to raid it, or to take possession before the gigantic holding company could establish itself through its army of private guards and latest war machines. No petty buccaneer, this Corvus; he held high ambitions. Basil had thought it strange that he went to the trouble of capturing the old freighter, *Polaris*, with its crowd of emigrants that would bring him practically nothing in ransom money. Now the reason was obvious.

Unquestionably Corvus had learned through a spy in the Basil offices that the unknown discoverer of the mine was arranging for the sale of his find to the Basil interests, but demanded an authorized representative of the elder Basil—Tom's father—to meet him at New Chicago, on Ganymede, and learn from his own lips the location of the mine, and make payment. No radio, audio-vision or correspondence in this part of the deal; there was too much

at stake. So Corvus had to depend on capturing this representative, who chanced to be Tom Basil, on the *Polaris*.

"Out with him!" ordered Corvus tersely. "He ought to bring five rood on the auction block at Pluto with those shoulders. Get him into shape. He has been beaten up too much."

Xabbus grunted something in protest that the prisoner had fought like a hellcat, and shoved Basil on out through the air lock.

They had landed on one of the planetoids of that extraordinary density that gave it many physical aspects of the larger habitable planets. The atmosphere was peculiarly invigorating, a fact that led Basil to believe that the little planet was Diastrophe, a reputed pirate rendezvous.

Two hundred-odd prisoners, including the passengers and crew of the ill-fated *Polaris*, huddled together in a hollow of the distorted rock in which the *Medusa*, Corvus' ship, had landed. They were absorbing as much warmth as possible from the pale sunlight while they stared drearily about them. In the center of the hollow was a rock pool fed by a tiny mineral spring which just now was being sucked dry by a long hose from the *Medusa*.

Basil studied the captives. Many of the passengers must have been killed in the fighting, and the rest were beaten and apathetic. No use to try to count on them in any plan for escape. He dismissed them from his mind, and considered himself. Already Corvus must have radioed back to his spy in New York that the stoop-shouldered emissary had not shown up on the *Polaris*, and the spy would very shortly

ferret out the information that Will's place had been taken by himself, Tom.

He chose not to consider what would take place then. He would be far better off dead, for then no one but himself would be injured—a fallacious conclusion, since he knew perfectly well that Corvus would relentlessly keep up the search, and next time Will would be the emissary, and Corvus would not be so unfortunate.

No use to try flight. Corvus' guards were posted all about the hollow. They would ray him before he was fairly started. Even if he escaped them, there awaited only starvation among the twisted rocks. He would have to evolve some other plan. Meantime, he might as well snatch what sleep he could.

He stretched out on the comfortable rock, where the sun would strike him with its fullest strength, and closed his eyes.

It seemed but an instant before a great shouting brought him to his feet at a leap, wide awake. The other prisoners were staring excitedly aloft. Down out of the depths of the sky floated a long, narrow black ship, sinking to a landing in the hollow. After a single glance Basil sat down again dispiritedly. He had glimpsed a small skull and crossbones and the name, *Death Head*, near the bow. Only another pirate ship.

He glanced at Corvus' ship, and saw about it the faint misty veil of the electronic shield thrown out as a protection against possible disintegrator rays the newcomer might loose at it, while the heavy ray artillery of the *Medusa* was trained aloft. Corvus was taking no chances.

Majestically the black ship settled down on the opposite side of the little

pool. An air lock clanged open, and a number of armed men sprang out and let down a short gangplank. Other air locks in the craft were swiftly opened to air the ship. Presently a hugh beast of a man in none too clean gaudy finery appeared.

Two of the *Medusa's* crew, standing on guard duty near Basil, were watching him and talking together. Basil caught the name "Morto." It meant nothing to him. The newcomer must be one of the swarm of buccaneers infesting the lawless reaches of the Void among the outer planets.

Morto came swaggering about the pool toward the *Medusa*, pausing now and then to leer at a captive, who shrank back from him.

"Where is your master? Where is Corvus?" he bellowed at the two guards near Basil.

One of them indicated the ship. Morto scowled.

"Call him to me, thou disintegrated son of Tycho!" he bellowed.

The pirate turned hastily, but discovered Corvus calmly walking out of the air lock of the *Medusa*. Morto's manner changed swiftly. A wide, toothless gash of a grin split the bottom part of his face as he stepped forward. Corvus' eyes were bleak and his mouth stern.

"Greetings, Corvus," exclaimed Morto with ponderous joviality, extending a huge paw. "I see the Fates of the Void have given you a likely handful of captives for a wealth of ransom, or mayhpa the slave markets of Pluto. Like as not a wealth of scrip and coin as well."

"Very little, Morto," replied Corvus coldly, ignoring the extended hand. "I was seeking a man, but the Fates

gave me the wrong tip. Emigrant crowd this, and almost no ransom in sight."

"Now that's bad, bad," sympathized Morto, with ill-concealed satisfaction at his rival's poor luck. "But it need not be a total loss, for I would buy some of the captive crew to teach my men to operate new machinery on my ship."

Corvus studied him sharply.

"New inventions?" he queried.

"The latest and newest," bragged Morto, while the guards glanced covertly at his ancient ship and grinned at each other. "When a man has been cruising the Void beyond the Frontiers for five years he is bound to lose track of the newest devices. King Phaet, of Pluto—'twas he that financed me for the cruise—had my ship overhauled and re-equipped on my return. The finest and newest! space suits that would make a man feel as safe as a babe in a cradle if he were stranded in one of them halfway between here and the Great Nebula in Andromeda! Ray artillery that would blast out the Sun itself! Other powerful apparatus I scarcely know the names of, not to mention using. So I must have men to show me how to use it."

"I see," replied Corvus ironically, then added with a flicker of real interest, "What was this cruise, Morto? Another search of the Strange Planet?"

The two guards promptly forgot their prisoners and drew closer to hear the latest news of this fabled world that had lured adventurers out into space beyond Pluto for the last two centuries.

"Aye," admitted Morto a trifle surlily. "We found nothing of it.

Now and then we heard rumors on the planets of darkness where we landed, but that was all. But it is a grand place out there in the darkness, a place of war with the savages, of loot, of divine females. I'm going back."

Basil arose casually and sauntered off around the pool past the listless captives, leaving Corvus and his guards absorbing Morto's tall tales of his search for the fabled planet. Basil had a plan in mind, desperate indeed, but apparently less perilous than remaining within reach of Corvus.

Indifferently he inspected the black snout of Morto's ship, and read the name, *Death Head*, then, with a glance behind him to see if he was being watched, he slipped past the bow and down the side away from the pool toward the nearest air-lock.

A hairy Venerian stood on guard before it. At the sound of Basil's tiptoed approach he whirled about and discharged his ray pistol. Basil, less than a foot from him, felt the heat of the ray on his arm as he closed in. He gripped the Venerian's wrist with one hand; the other leaped to the Venerian's throat. Madly they weaved about, the tortured rock beneath their feet, while the pirate clawed madly to break the grip of the merciless fingers about his throat, and then tried vainly to jerk his gun-hand free.

He sensed his coming doom. In a panic, he wrenched fiercely about. Just one cry for help! A score of armed companions with ready weapons waited a scant few yards away inside the ship. Basil clung to him with the grimness of death.

The venerian's heel tripped over a stony nodule and he fell, crashing the

back of his skull against the rock. Basil arose from the dead body, dazed and breathless. Swiftly he dragged the dead pirate into a nearby water-worn crevice, stripped off the short trousers, the gravity shoes, and tunic, and donned them himself. They fitted rather loosely, but there was no choice. Then he strapped on the belt with its holster, hurried back to the air-locks, picked up the undamaged ray pistol, and entered the ship.

A foul, unclean odor assailed his nostrils, and he glanced about the empty passage. Dirt and rust were thick. He did not pause but hurried aft, coming presently to the power room where the compact little electronic motors whirled the mighty dynamos of the ship. He climbed up the steel ladders, and found the hiding place he sought, the customary little-used cubby behind the automatic switchboard.

The porthole in it opened on the poolside of the ship. He wiped off the cobwebs and dirt and peered out. Morto and his guards were returning to the ship, prodding before them half a dozen apathetic members of the *Polaris'* crew, evidently purchases by Morto from his fellow buccaneer.

Within a few minutes, during which Basil knew that the ports were being closed, the ship lifted gently into the air and with gradually increasing speed passed swiftly out of the atmosphere of Diastrophe into the iron cold of interstellar space. Basil wondered whether they were bound. His wonder was brief, for the ever pressing problem of his own safety soon thrust it into the background.

He couldn't remain a stowaway for

long, for ultimately the crew would find him, and if they didn't he would be driven out by hunger and thirst. What explanation could he make when he had to face *Morto*? He glanced down at his grimy hands and acquired clothes. Quite a passable pirate! He grinned. Then he rose abruptly, stepped out into the passage and swaggered forward toward the crew's quarters.

No one accosted him until he entered the forecastle. Several dozen members of the crew off duty, lounging there, stared at him with sudden suspicion and fell silent. Basil spat deliberately on the deck and grinned.

"It's right good to see a comfortable, homey place like this where an honest man may sit about during the off-watch and do as he pleases, without having a guard at either end to watch his every move," he observed loudly. He had heard that *Corvus* maintained the strictest of discipline in the fore-castle of the *Medusa*. Certainly this stinking place could have little ordered routine!

A huge Martian—a petty officer by his insignia—who sat on the edge of a nearby bunk, thrust his half-drawn pistol back into its holster.

"Deserter from *Corvus*?" he questioned, with a hint of irony.

Basil shrugged.

"Not exactly a deserter," he pointed out. "I've just changed masters."

The Martian grinned maliciously, but he made no comment. One of the others, a rat-faced Earthman, nodded.

"Can't blame you," said he. "My own brother was with him. He inhaled a powkash one night in his bunk to settle his nerves. Broke *Corvus*' rule about keeping no powkash aboard. So

Corvus took my brother, and spread-eagled him on the electric grill. The rest of the crew sat around watching and laughing, while he toasted brown and died."

Basil shivered a little. He was not yet immune from that self-same grill. The Martian's face twisted sardonically.

"*Morto* has no grill, but he has a few pets," he remarked enigmatically.

The others abruptly straightened up and looked on Basil with new interest. Then someone guffawed loudly. Basil masked his irritation under a forced grin. What was the Martian hinting at? He had risen and loosened his pistol in its holster significantly.

"Come on up and meet your new master," he sneered.

Basil dropped his hand to his pistol butt. Something prodded him in the back. Another loud guffaw swept the fore-castle. White and tense, he raised his hands mutely while the Martian took his gun from him and silently directed him out into the passage.

The door of the control room above opened at the Martian's knock, and they entered a large cabin where the long lines of heavy glass ports revealed the ebon curtain of infinite space with its brilliant points of distant flaming suns. *Morto* sprawled in a huge easy chair. Nearby, at the control table, sat the navigating officer. *Morto* looked up inquiring at the Martian.

"What's the trouble, *Kru*?" he asked.

"Here is one of *Corvus*' men who decided to change masters, *Sirro*," explained the Martian with his twisted grin.

Morto's little pig eyes brightened with an unholy light, and he licked his thick lips avidly.

"A gift from the gods, just when my poor little dears were famishing!" he exclaimed with mock piety. "Thank you, thank you, for changing masters, my man! Otherwise my pets would have been forced to wait until the men from the *Polaris* had completed their instruction of my crew in the new machinery."

Basil remained tense and silent, wondering what devil's holiday they were preparing for him. Morto heaved his huge bulk out of the chair and pushed it back, off the stained, grimy rug in the middle of the deck flooring. Then he caught the edge of the rug and swiftly rolled it up.

The floor beneath was of glass, below which yawned a darkened pit. Morto snapped on a wall switch. At once the glass-covered pit was illuminated.

"Meet my little pets," he announced with a grin.

Basil gasped in spite of himself. The pit was about twelve feet deep and a dozen feet square, and was walled with glass. The floor was covered with a crimson mass that was stirring under the brilliant light. Thousands upon thousands of tiny, red scaled creatures that rushed up the smooth glass wall and clung on the under side of the deck floor, staring expectantly with beady green eyes. Martian lizard mice! They were less than an inch long, had needle-sharp teeth, and were governed by a vicious ferocity that was unequalled anywhere in the universe.

At the scent of living animals they went wild, killing recklessly, madly. On their native planet they had been

know to lay bare huge tracts of land of every living thing, eating cities in a night, and propagating swiftly and vastly, immediately following and even during the feeding period. Martian governments had spent billions of dollars fighting the plague, and so serious a menace was it, a death sentence hung over the head of any man taking the things to another planet. Yet here was a beast who amused himself with them!

Morto pointed out a little screened-in partition of the pit. Then he moved a lever on the wall. A section of the heavy glass flooring above this partition upended like a trapdoor, filling the control room with the overpowering stench of putrefied flesh and the fetid odor of the lizard mice themselves.

"Allow me to explain the simple operation of their little home," continued Morto with vast satisfaction. "The person about to be entertained is lowered through the trapdoor into the little screened-off partition, and the trapdoor is closed. Then I move this lever on the wall—the one I am pointing at—and the two sides of the partition, which are but doors, swing back against the glass walls of the cage. That permits the guest in the partition to step out into the main part of the cage and introduce himself. Usually, we allow the guest to wait a little while in the ante-room, so to speak, while my little pets get themselves in a suitable frame of mind to receive him."

Basil felt a trifle faint. The lizard mice were swarming over every inch of the screen, chirping and squeaking frenziedly as the odor of the humans floated down to them. On the floor

in one corner was a partly eaten woman's sandal, and in the opposite corner a piece of a human skull.

"You see," elaborated Morto with relish, "it was this simple little pastime that kept us all from going insane during our five years' cruise in the outer Void. The officers sit up here, and the crew fight for seats down there around the glass walls of the cage. You will have quite a large audience."

Basil glanced about desperately.

The Martian stood immediately behind him with a ray pistol jammed against the middle of his back. The navigator was in front with another pistol. Basil was thinking rapidly. Should he tell them that Corvus would pay a good price to get him back? No! That would only mean an equally horrible death on the electric grill in the torture chamber of the *Medusa*—although Corvus was no depraved beast like this Morto, who killed for the mere pleasure of it.

"Better leave the prisoners in from the brig," said Morto to the Martian, using an ancient sea-term for the ship's prison. "No need to set the time-lock on them, though. Just bar the door. Then you may notify the crew that the feeding of the lizard mice will take place immediately after mess."

Basil's eyes alighted on an emergency space suit—doubtless Morto's own—standing in a ready position against the side of the cabin near the emergency air-lock exit. A vague idea flashed through his mind but before he could develop it, the radio loudspeaker on the control table, ever tuned to catch communications from other ships of the Void, hum-

med suddenly to life. Morto whirled about, tense and grim. The Martian petty officer momentarily forgot his prisoner, and the navigator leaped back to his place at the controls, unconsciously shoving his pistol back into its holster again.

"Ahoy, Morto," boomed a thin metallic voice in the speaker. "Ahoy, there, aboard the *Death Head*!"

"Ahoy, Corvus; I know your voice," shouted Morto in reply, hurrying to the answering microphone. "What is the matter?"

The sound of a soft thud behind him escaped Morto's ears.

"I am seeking a prisoner who has escaped me, one Thomas Basil," replied Corvus. "He is about five feet ten; broad-shouldered and powerfully built, weighing about a hundred and eighty-five; has blue eyes and brown hair. I think he escaped me at Dias-trophe, where I have reason to believe he boarded your craft. I must have him back unharmed."

Morto's bushy eyebrows drew down in a black scowl.

"Suppose I should find him aboard, what is there in it for me, if I return him to you?"

"Four rood."

"But I can get more for him than that at the Plutonian slave markets!"

"I'll give you four rood, Morto; and if you don't return him to me unharmed, I'll hunt you down, if I have to follow you clear to the Pleiades to find you," the metallic voice was cold and deadly. "And don't forget that my ship can outrun yours a thousand miles an hour. I am overhauling you now."

Morto opened his mouth to reply, but the sound of a heavy body strik-

ing the deck behind him interrupted. He and the navigator whirled about. The Martian petty officer, his face black from near strangulation, sprawled unconscious at the feet of Basil, who was crouching ready to spring. With a startled oath the navigator clutched his pistol.

Basil had no chance to snatch up the fallen Martian's gun. He leaped. The navigator's ray pistol broke free of its holster as Basil seized him, gripping the gun hand and whirling the man between himself and Morto. The big pirate captain flashed out his ray pistol with astonishing swiftness. It hovered over the struggling men, but there was no clear shot at Basil.

The radio speaker was still booming out Corvus' deadly threats; but no one paid any heed. Basil had his hands full keeping the struggling body of the navigator between himself and Morto's pistol, and also keeping the navigator from raying him with his own weapon. Morto watched them. A cunning, twisted grin appeared. He slipped his own pistol back into its holster and drew a long Plutonian knife.

Farther and farther over came the navigator's gun-arm under the irresistible grip of Basil's powerful fingers. The man screamed suddenly, as the bones of his forearm snapped, and the pistol clattered harmlessly to the deck. Morto had barely time to thrust with his knife as Basil flung the navigator at him. The knife bit deep. The navigator screamed horribly and fell dying to the deck, with the knife buried hilt-deep in his back.

Neither Basil nor the captain had time to give him a glance. Basil had closed in with battering, sledgehammer

fists that rocked the bigger man on his heels as he fumbled at his holster for the pistol which had fouled in his belt and would not come free. A solid blow to the jaw brought him up against the edge of the control table. He shook his head with a mighty bellow, forgot the pistol and charged with arms outspread and clutching like a primitive cave-man.

Basil leaped back. His foot slipped on the blood-smeared glass deck beside the dead body of the navigator, and he nearly fell. Morto's huge arms caught him fair.

A sardonic laugh sounded behind them. The Martian had nearly recovered and was reeling toward them, pistol in hand.

"Don't ray him," panted Morto savagely. "I've got him now. Bring the crew to watch. Barehanded I'm going to throw him to the lizard mice!"

The Martian weaved back to the door and disappeared, still laughing. A red haze was forming before Basil's eyes. The agony of those mighty arms was almost unendurable. He had twisted half around, with his free arms striving vainly to batter the brutal face behind him. His pawing hands found the neck, and his fingers interlocked behind it in an ill-formed head-lock.

A frenzied heave. Morto's feet left the deck. Over Basil's shoulders he catapulted, carrying Basil with him. They crashed to the glass deck together the death lock of the pirate's arms broken. Basil arose on unsteady legs from the stunned body of the pirate gulping the sweet air of life into his tortured lungs.

"I'm overhauling you fast, Morto," sounded Corvus' metallic voice in the

loudspeaker. "This is the third and last time I am asking you to heave to and deliver my prisoner. There will be no more offers after this. I am opening with my heaviest ray batteries the instant I am within range."

From the opened glass trapdoor came the frantic squeaking and chittering of the bloodthirsty lizard mice, driven wild at the smell of blood, while below decks the Martian petty officer was getting out the crew.

Basil steadied his whirling thoughts. He would have to act! What should he do? What, what? That idea a few minutes ago, or few hours ago, what was it? He forced himself to remember. The space-suit! Desperate, last chance! As he reeled toward it, he saw Morto beginning to twitch back to consciousness. Basil slid into the space-suit. Even in his desperate haste and anxiety he marveled at the advanced perfection of the suit. Almost a space-ship in itself!

Swiftly he buckled and bolted it shut, his fingers fumbling over the unfamiliar fastenings. Safe and sound inside its air tight interior! He snapped on the minute electronic motor that set the air purifier, gravity plates and other life-sustaining and guarding apparatus to functioning.

Morto arose on his hands and knees and shook his great shaggy head so that his jowls quivered. He glared about the control room, his glance coming to rest presently on the space suit with Basil's head watching him from inside the glassoid ball helmet. An instant Morto stared, then he licked his thick lips and grinned evilly. He began to crawl toward the nearest ray-pistol.

Then abruptly he halted, his face paling to a dirty grey of horror. Bas-

il's hand rested on the lever that opened the screen doors inside the glass cage of the lizard mice below. With a wild curse, Morto hurled himself toward the pistol. Basil jerked down the lever.

Up out of the cage surged a crimson wave of maddened lizard mice. Morto forgot the pistol. With a hoarse scream of terror, he dove for the door. Before he could reach it, the first wave of maddened, bloodthirsty vermin was lapping about his feet and bare legs.

Screams of horror changed to agony. He pawed and struck at the ravening lizard mice. In blind desperation he started for the door again, and collapsed abruptly as the tendon of an ankle parted under gnawing, needle-pointed teeth. A crimson, wriggling wave engulfed his struggling body.

Basil turned his head away. There was no need to, for the glassoid ball helmet was suddenly covered by swarming, frenzied lizard mice seeking to get at him. He knew the entire space suit must be covered with them. He shivered in involuntary horror. Would the space suit hold? He had banked everything upon it. The futile gnawing of their pointed teeth set up a whispering sound. He brushed away the vermin before his eyes.

The entire control room was a crawl with them, even to the smooth steel deck overhead to which they clung with their sucker feet. The crimson mound that was Morto was now stilled. Basil saw the door opening. The Martian petty officer was returning with the crew! Basil laughed grimly as he glimpsed the horrified faces of the men. Then the lizard mice swarmed over his helmet again, veiling the sight from him. When he brushed them off

again, the sour-faced Martian and his companions had vanished and the lizard mice were pouring out of the control-room door into the ship.

Part of Morto's skeleton was already bared. Nauseated, Basil turned away.

He glanced at the controls, which were not deserted by the lizard mice, which were leaving him as well in their primordial urge to find food and to kill. The ship was all on its course. Then for the first time it occurred to him to cut in the outside sounding disc.

At once the big alarm gongs of the ship burst on his ears, and from the depths of the ship came the agonized screams of the dying crew. He glanced mechanically through the port aft, and stared. A circular black shadow cut off the stars. The shadow dwindled swiftly. Another shadow followed, and last of all another. Understanding dawned. Space fliers! The crew still remaining in the forecastle had been warned by the gongs that the crimson terror was loose, and had abandoned ship in the space fliers doubtless kept just below the forecastle for such an emergency.

Going back to hunt up Corvus! Basil ardently wished he could have rayed them. By the way the loud-speaker had failed silent, Corvus must be overhauling the *Death Head* in grim silence to carry out his threats. Basil glanced about the control room curiously. Alone on this death-ridden black pirate craft hurtling out through the depths of space!

No, not alone after all! Those imprisoned members of the *Polaris*' crew might still be alive—if the lizard mice had not forced a way into the brig and destroyed them. There must be

some way to rescue them. With their help to operate the *Death Head* he might yet be able to throw off Corvus' ship and escape. Better yet, they could escape in one of the space fliers! Hope surged high, as he eagerly caught up one of the gas fire extinguishers and hurried down into the depths of the ship.

Half an hour's searching proved conclusively that escape in a space flier was out of the question, for not one of them remained in the big craft. Downcast but still resolute, he sought out the brig, which proved to be a mere cell in the side of a passage far aft. Even there—before the door the lizard mice skittered about in their fierce search for more victims.

Basil surveyed the passage. At either end there were doors—doubtless a precaution against any possible break for freedom by inmates of the brig, for which Basil was devoutly thankful, since it made the rescue of the imprisoned men possible. He noted that the air ventilators were protected by a fine screen. He grinned happily and hurried back up to the control room.

From the racks there along the side of the room he carried down to the door of the brig eight space-suits one after the other. Then he closed the doors at either end of the passage and set to work with the gas fire extinguisher clearing the passage of the lizard mice. After filling the passage thoroughly with the gas, he waited a quarter of an hour for the ventilators to remove all fumes to the air-purifier of the ship, positive that all the deadly vermin in the passage were killed. Then he unbarred the door of the prison room and entered.

Six men were waiting there, anx-

iously alert. The were all trained electrical and ray engineers, from their sleeve insignia. He grinned and loosened the glassoid helmet.

"Just another prisoner, like yourselves," he introduced himself as he removed the globe from his head. "We are the only men left alive on the ship. Martian lizard mice have eaten the rest."

Their eyes widened, and they pressed eagerly about him, bombarding him with questions. Swiftly he told of the fight he had made, and outlined his plans.

"No one can live on this ship without a space-suit," he explained. "And I have more than enough of them for all of you outside in the passage. Since there are no more space flyers aboard, it's up to us—to you—to get enough speed out of this old tub to run away from Corvus."

They shook their heads dejectedly.

"That's impossible," pointed out one man, a lean, gloomy fellow who gave his name as Sidler. "This craft is only about average at best, even with the modren machinery, while Corvus' ship is beyond doubt the swiftest craft in the Void. The heads of all space navies admit it. It is one reason he dares to venture inside the patrols of the four inner planets and make his raids."

"We can try, can't we?" retorted Basil.

"I reckon so," admitted Sidler gloomily. "If Corvus isn't actually within sight of us, we can stop the motors and generators, and so eliminate the electronic field that gives him our position on his tri-dimensional chart. Then we can use the emergency primitive combustion rockets to

shove the ship off its present course, and perhaps vanish, while he continues on our original course, wondering what has become of us. But he's probably in sight of us already," he added pessimistically.

"Fine!" exclaimed Basil enthusiastically, ignoring the last remark. "Jupiter is off our port bow a few million miles. Maybe we can pick up Ganymede; that's my destination anyway."

The men hurried into their space suits. It developed that not one of them was versed in space navigation, so they settled that position on Basil, whose experience in the science consisted of a couple of vacation trips to the Moon in a space flier his father had given him three years before. He felt that he had enough knowledge to make a landfall on one of Jupiter's satellites.

The others volunteered for the different posts that they felt able to handle. A youth named Hinch, who possessed a sketchy knowledge of the nearly forgotten art of rocketry, undertook the responsibility of shifting the direction of the ship's flight with the primitive combustibles. Sidler took charge of the power room, and Smith undertook the responsibility of the ray artillery. The other three endeavored to try as best they might to cover the switchboard and inspection posts.

All agreed finally that they would communicate with each other through the speaking discs with which the space suits were equipped, and not use the ship's signal system—a practise that would be necessary anyway, as soon as the generators stopped.

Basil hurried back to his post in the control room, paying no heed to the

clean skeletons of the pirate crew, that lay here and there along the passage, nor to the lizard mice that frequently swarmed up his space suit and tried vainly to force an entrance into his glassoid helmet.

As soon as he reached the control room, he cut in the outside sounding disc of his helmet and listened. The loudspeaker on the control table was silent. Corvus evidently had nothing further to say to Morto—scant good would it have done him to say it since Morto was dead. Corvus was probably hanging grimly to the pursuit to settle matters with him. It was too much to hope that Corvus might have abandoned the chase.

Basil turned the telecroscope aft. The *Medusa* was not to be seen. He addressed the speaking disc at the base of his helmet.

"I can't see Corvus," he said. "The light of the sun should quarter on his ship at this angle. It seems safe to cut off the power and proceed with the rockets."

"O.K.," replied Sidler far down in the big generator room. Next instant the lights of the control cabin blinked out, and all the machinery of the huge craft ceased to function, save only the loudspeaker on the control table, which was now drawing its power from a special battery under the said table.

Hinch climbed out through an airlock and walked along the outside of the hull, clamping on his rockets at regular intervals throughout its length, set them off, and climbed back inside again, while the long yellow flames of rocket fire leaped miles out into space. Basil watched a star creep across a glass port. Slowly, but surely, the rockets were forcing the big ship out

of its course.

Abruptly the radio speaker on the control table hummed to live.

"Very clever, Thomas Basil boomed the cold metallic voice of Corvus sneeringly. "But you've overplayed your hand. I have picked up the two space fliers from the *Death Head* with the remnants of Morto's crew in them, and learned that his little Martian pets got out of their glass cage and overran the ship. I had believed until this minute that you had been eaten with the rest, and I was ready to abandon the chase when I saw your lights go out, and saw the flare of your rockets. A clever idea to lose me, Earthling, but you are a trifle late."

Basil whirled about and stared at the star powdered blackness of space. How could that fiend see them when he couldn't be seen himself? Corvus uncannily read his thoughts across the Void.

"Doubtless you looked back for me, Basil, but I dropped below the Ecliptic when I first took up your trail. I'll be with you shortly. This time I shall not attempt to take you alive, for I have found another method of getting the information I seek from your father. And even though I should want to take you alive, I have no more room now. When Morto's crew arrived, I was forced to relieve myself of the *Polaris*' passengers. Even now their forzen corpses are trailing my ship like a flock of sheep.

"Sidler, Sidler!" cried Basil into his speaking disc. "That devil tricked us after all! He dropped below the Ecliptic and is somewhere under our stern. Start the motors again! Throw out the electronic shield!"

"It's no use," replied Sidler apathet-

ically, and the sighs of the others in various parts of the ship could be heard. "Those ray guns of his will cut through the shield like a knife through cheese."

"Our own artillery is out of commission," interrupted Smith from the gun deck. "I have been examining it carefully. The insulating paint on the tripper springs of the discharging mechanism has been eaten off by the lizard mice. The best we can muster is a battery of a few super-rifle rays, which will be about as effective as squirting the *Medusa* with a water hose. It's all up with us. I wish my folks back home could muster up some ransom."

Basil's face flushed angrily. He was framing a hot retort when the lights flashed on. Sidler had started the motors again. Basil promptly grasped the equilibrator wheel and rolled the ship one hundred and eighty degrees on its fore-and-aft axis, a proceeding scarcely noticeable except for the shifting of the star-studded heavens without. Then he looked back.

Sure enough, there was the *Medusa* already more than first dimension size above and behind them now. Basil called to Sidler to crowd on every bit of power.

"I'll do my best," replied Sidler glumly. "But the left main motor has become badly polarized through neglect, and it may go to pieces."

Under normal conditions, Basil would have been horror struck, for when an electronic motor—normally the safest thing imaginable—became polarized and went to pieces, the resulting explosion made one of those ancient powder-ship blow-ups on the sea seem as harmless as the popping

of a paper sack, but now in the face of their growing danger it seemed quite matter-of-course that the motor should turn into a menace.

"Give her all she can stand without cracking, Sidler," he said calmly. "It can't do any worse than cheat Corvus out of the pleasure of killing us, anyway."

He glanced back at the *Medusa*, which was now football size, so rapidly had it overhauled them. Again Basil grasped the equilibrator wheel and rolled the ship ninety degrees. This brought Corvus' ship on the same plane as themselves, so to speak, off to starboard and stern. Then Basil threw in the electronic shield switch which promptly set up a vague, misty mantle about the *Death Head* as protection against the rays.

Corvus promptly followed suit by throwing out his own electronic shield, and revolved his ship so that its bottom no longer faced Basil, but instead the two ships were broadside. A sheet of disintegrator rays flamed from his heavy artillery, darting across the miles of empty space and striking harmlessly against the *Death Head's* electronic shield.

Basil recognized it as a range-finding salvo. Corvus would have to swing the *Medusa* close in before his rays would penetrate the shield and strike the *Death Head*. In close! A plan flashed into Basil's mind, a plan so wild and daring that he gasped. He checked it over swiftly. Unheard of, incredible, yet there was a chance, one in a thousand, probably, of pulling out alive and safe. He glanced again at Corvus' ship, now edging gradually toward them and occasionally loosing a ray to test the strength of

their electronic shield. Then he spoke rapidly into the speaking disc.

"Men. I've got a plan. It's a desperate one, Goodness knows, but it is our only chance."

They listened in growing amazement as he outlined it. Silence followed.

"Well, what do you think of it?" he asked impatiently.

"I—I don't know," replied Hinch uncertainly: "It looks like a new form of suicide to me, but I reckon Death is going to take this pot, any way we play it."

Sidler coughed.

"Anything is better than Corvus," he observed gloomily. "We're done for anyway. We might as well try it."

The others agreed, and hastened to their allotted posts. Corvus' ship was quite close now. The stabbing of its heavy rays was beginning to puncture the electronic shield and bite into the hull of the *Death Head*. Basil selected the heaviest disintegrator rifle from the rack nearby and began swiftly to cut out a four-foot circle in the port side of the cabin. The ray of the weapon bit through the heavy voison steel as though it were butter. A circle from the inner hull came free and fell outward. Rapidly he cut out a corresponding circle in the middle hull, and another in the outer wall. The rush of escaping air carried the segment of the outer hull far out into space. Charts from the table and other small loose objects in the cabin, including hundreds of dying lizard mice, were swept out of the opening as the air rushed out into the emptiness of space.

As he dropped the rifle, the lights of the ship dimmed momentarily, as Smith on the gun deck discharged a volley of rays from the super-rifles at

the *Medusa*, which was not a scant mile away and was blasting them mercilessly. Smith's volley was mere camouflage.

"Hurry men!" cried Basil, as he dove into the emergency repair chest beside the control table and pawed out a long length of thin copper wire. He looped one end about the control lever at the table, and clambered hastily out through the hole in the ship into space, unrolling the wire as he went.

"All Clear?" he asked tersely into the speaking disc.

His six companions were already out of the craft, and answered affirmatively. He jerked the wire hard and let go of it. Instantly the big space ship slid away from him in a wide arc toward Corvus' craft. Only the safety checks built in the propelling mechanism kept it from leaping toward the *Medusa*, a factor that Basil had planned on.

Corvus must have seen it sweeping toward him and failed to realize his peril—as Basil calculated he would. Corvus obviously judged the maneuver to be a dying, frenzied effort to get the *Death Head* inside his own electronic shield and blast him with every ray Basil could muster. Basil could imagine him smiling contemptuously as he drew off, allowing the *Death Head* to inch almost up to him while he inflicted terrible punishment, so he thought, with his heaviest batteries.

Ten miles across the Void away from Basil and his companions the two ships moved. Then a magnificent, blinding flash burst against the eternal curtain of space, as a terrific explosion

(Continued on page 130)



THE GOSTOK AND THE DOSHES

MILES J. BREUER, M.D.

Illustrated by MOREY

*EVERYTHING IS RELATIVE . . . There seems to be very little doubt about that statement. We can't just "move"; we must move in relation to something else. This brings us to the question of "relativity" and Einstein. And in the matter of gravitation it is very likely that no one will ever know what it is. Acceleration may increase our apparent weight; inertia may do the same, but neither is gravitation. But let Dr. Breuer talk for himself. Unless we very much miss our guess, "The Gostak and the Doshes" is going to create a lot of "distimining." But be sure to read the story when your mind is thoroughly clear and rested. There will be a marked difference in your reaction. **

* This is the original blurb which appeared when this story was published.

Let the reader suppose that somebody states: "The gostak distims the doshes." You do not know what this means, nor do I. But if we assume that it is English, we know that the doshes are distimmed by the gostak. We know that one distimmer of the doshes is a gostak. If, moreover, doshes are galloons, we know that some galloons are distimmed by the gostak. And so we may go on, and so we often do go on. —Unknown writer quoted by Ogden and Richards, in *THE MEANING OF MEANING*, Harcourt Brace & Co., 1923; also by Walter N. Polukov in *MAN AND HIS AFFAIRS*, Williams & Wilkins, 1925.

Why! That is lifting yourself by your own bootstraps!" I exclaimed in amazed incredulity. "It's absurd."

Woleshensky smiled indulgently. He towered in his chair as though in the infinite kindness of his vast mind there were room to understand and overlook all the foolish little foibles of all the weak little beings that called themselves men. A mathematical physicist lives in vast spaces where a light-

year is a footstep, where universes are being born and blotted out, where space unrolls along a fourth dimension on a surface distended from a fifth. To him, human beings and their affairs do not loom very important.

"Relativity," he explained: In his voice there was a patient forbearance for my slowness of comprehension. "Merely relativity. It doesn't take much physical effort to make the moon move through the treetops, does it? Just enough to walk down the garden path."

I stared at him and he continued: "If you had been born and raised on a moving train, no one could convince you that the landscape was not in rapid motion. Well, our conception of the universe is quite as relative as that. Sir Isaac Newton tried in his mathematics to express a universe

Copyright 1930 by E. P. Co., Inc.

as though beheld by an infinitely removed and perfectly fixed observer. Mathematicians since his time, realizing the futility of such an effort, have taken into consideration that what things 'are' depends upon the person who is looking at them. They have tried to express common knowledge, such as the law of gravitation, in terms that would hold good for all observers. Yet their leader and culminating genius, Einstein, has been unable to express knowledge in terms of pure relativity; he has had to accept the velocity of light as an arbitrarily fixed constant. Why should the velocity of light be any more fixed and constant than any other quantity in the universe?

"But, what's that got to do with going into the fourth dimension?" I broke in impatiently.

He continued as though I hadn't spoken.

"The thing that interests us now, and that mystifies modern mathematicians, is the question of movement, or more accurately: translation. Is there such a thing as *absolute translation*? Can there be movement—translation—except in *relation* to something else than the thing that moves? All movement we know of is movement in relation to other objects, whether it be a walk down the street, or the movement of the earth in its orbit around the sun. A change of *relative* position. But the mere translation of an isolated object existing alone in space is mathematically inconceivable; for there is no such thing as space in that sense."

"I thought you said something about going into another universe—" I interrupted again.

You can't argue with Woleshensky.

His train of thought went on without a break.

"By translation we understand getting from one place to another. 'Going somewhere' originally meant a movement of our bodies. Yet, as a matter of fact, when we drive in an automobile we 'go somewhere' without moving our bodies at all. The scene is changed around us; we are somewhere else; and yet we haven't *moved* at all.

"Or suppose you could cast off gravitational attraction for a moment and let the earth rotate under you; you would be going somewhere, and yet not moving—"

"But that is theory; you can't tinker with gravitation—"

"Every day you tinker with gravitation. When you start upwards in an elevator, your pressure, not your weight, against the floor of it is increased; apparent gravitation between you and the floor of the elevator is greater than before—and that's like gravitation is anyway: inertia and acceleration. But we are talking about translation. The position of everything in the universe must be referred to some sort of coordinates. Suppose we change the angle or direction of the coordinates: then you have 'gone somewhere' and yet you haven't moved, nor has anything else moved."

I looked at him, holding my head in my hands.

"I couldn't swear that I understand that," I said slowly. "And I repeat, that it looks like lifting yourself by your own bootstraps."

The homely simile did not dismay him. He pointed a finger at me as he spoke:

"You've seen a chip of wood bobbing on the ripples of a pond. Now

you think the chip is moving; now the water. Yet neither is moving; the only motion is of an abstract thing called a wave.

"You've seen those 'illusion' diagrams, for instance this one of a group of cubes. Make up your mind that you are looking down upon their upper surfaces and indeed they seem below you. Now change your mind, and imagine that you are down below, looking up. Behold, you see their lower surfaces; you are indeed below them. You have 'gone somewhere,' yet there has been no translation of anything. You have merely changed coordinates."

"Which do you think will drive me insane more quickly—if you *show* me what you mean or if you keep on talking without showing me?"

"I'll try to show you. There are some types of mind, you know, that cannot grasp the idea of relativity. It isn't the mathematics involved that matters; it's just the inability of some types of mental organization to grasp the fact that the mind of the observer endows his environment with certain properties which have no absolute existence. Thus, when you walk through the garden at night the moon floats from one tree top to another. Is your mind good enough to invert this: make the moon stand still and let the trees move backwards. Can you do that? If so, you can 'go somewhere' into another dimension."

Woleshensky rose and walked to the window. His office was an appropriate setting for such a modern University campus, the varnish glossy, the walls clean, the books neatly arranged behind clean glass, the desk in most orderly array; the office was

just as precise and modern and wonderful as the mind of its occupant.

"When do you want to go?" he asked.

"Now!"

"Then, I have two more things to explain to you. The fourth dimension is just as much *here* as anywhere else. Right here around you and me things exist and go forward in the fourth dimension; but we do not see them and are not conscious of them, because we are confined to our own three. Secondly: if we name the four coordinates as Einstein does, x , y , z , and t , then we exist in x , y , and z , and move freely about in them; but are powerless to move in t . Why? Because t is the time dimension; and the time dimension is a difficult one for biological structures that depend on irreversible chemical reactions for their existence. But, biochemical reactions can take place along any one of the other dimensions as well as along t .

"Therefore, let us transform coordinates. Rotate the property of chemical irreversibility from t to z . Since we are organically able to exist (or at least to perceive) in only three dimensions at once, our new time dimension will be z . We shall be unconscious of z and cannot travel in it. Our activities and consciousness will take place along x , y , and t .

"According to fiction writers, to switch into the t dimension, some sort of an apparatus with an electrical field ought to be necessary. It is not. You need nothing more to rotate into the t dimension than you do to stop the moon and make the trees move as you ride down the road; or than you do to turn the cubes upside down.

It is a matter of *relativity*."

I had ceased trying to wonder or to understand.

"Show me!" was all I could gasp.

"The success of this experiment in changing from the x to the t coordinate has depended largely upon my lucky discovery of a favorable location. It is just as, when you want the moon to ride the tree tops successfully, there have to be favorable features in the topography or it won't work. The edge of this building and that little walk between the two rows of Norway poplars seems to be an angle between planes in the z and t dimensions. It seems to slope downwards, does it not?—Now walk from here to the end and imagine yourself going upwards. That is all. Instead of feeling this building behind and *above* you, conceive it as behind and *below*. Just as on your ride by moonlight, you must tell yourself that the moon is not moving while the trees ride by—Can you do that? Go ahead then." He spoke in a confident tone, as though he knew exactly what would happen.

Half credulous, half wondering, I walked slowly out of the door; I noticed that Woleshensky settled himself down to the table with a pad and a pencil to some kind of study, and forgot me before I had finished turning around. I looked curiously at the familiar wall of the building and the still more familiar poplar walk, expecting to see some strange scenery, some unknown view from another world. But there were the same old bricks and trees that I had known so long; though my disturbed and wondering frame of mind endowed them with a sudden strangeness and unwontedness. Things I had known for some years,

they were, yet so powerfully had Woleshensky's arguments impressed me that I already fancied myself in a different universe. According to the conception of relativity, objects of the x , y , z universe *ought* to look different when viewed from the x , y , t universe.

Strange to say, I had no difficulty at all in imagining myself as going *upwards* on my stroll along the slope. I told myself that the building was behind and below me, and indeed it seemed real that it was that way, I walked some distance along the little avenue of poplars, which seemed familiar enough in all its details; though after a few minutes it struck me that the avenue seemed rather long. In fact it was much longer than I had ever known it to be before.

With a queer Alice-in-Wonderland feeling I noted it stretching way on ahead of me. Then I looked back.

I gasped in astonishment. The building was indeed *below* me. I looked down upon it from the top of an elevation. The astonishment of that realization had barely broken over me, when I admitted that there was a building down there; but what building? Not the new Morton Hall, at least. It was a long, three-story brick building, quite resembling Morton Hall, but it was not the same. And on beyond there were trees with buildings among them; but it was not the campus that I knew.

I paused in a kind of panic. What was I to do now? Here I was in a strange place. How I had gotten there I had no idea. What ought I do about it? Where should I go? How was I to get back? Odd that I had neglected the precaution of how

to get back. I surmised that I must be on the t dimension. Stupid blunder on my part, neglecting to find out how to get back.

I walked rapidly down the slope toward the building. Any hopes that I might have had about its being Morton Hall were thoroughly dispelled in a moment. It was a totally strange building, old, and old-fashioned looking. I had never seen it before in my life. Yet it looked perfectly ordinary and natural, and was obviously a University class-room building.

I cannot tell whether it was an hour or a dozen that I spent walking frantically this way and that, trying to decide to go into this building or another, and at the last moment backing out in a sweat of hesitation. It seemed like a year, but was probably only a few minutes. Then I noticed the people. They were mostly young people, of both sexes. Students, of course. Obviously I was on a University campus. Perfectly natural, normal young people, they were. If I were really on the t dimension, it certainly resembled the z dimension very closely.

Finally I came to a decision. I could stand this no longer. I selected a solitary, quiet-looking man, and stopped him.

"Where am I?" I demanded.

He looked at me in astonishment. I waited for a reply, and he continued to gaze at me speechlessly. Finally it occurred to me that he didn't understand English.

"Do you speak English?" I asked hopelessly.

"Of course!" he said vehemently. "What's wrong with you?"

"Something's wrong with something," I exclaimed. "I haven't any

idea where I am or how I got here."

"Synthetic wine?" he asked sympathetically.

"Oh, hell! Think I'm a fool? Say, do you have a good man in mathematical physics on the faculty? Take me to him."

"Or psychiatry. But I'm a law student and know nothing of either."

"Then make it mathematical physics, and I'll be grateful to you."

So I was conducted to the mathematical physicist. The student led me into the very building which corresponded to Morton Hall, and into an office the position of which quite corresponded to that of Woleshensky's office. However, the office was older and dustier; it had a Victorian look about it, and was not as modern as Woleshensky's room. Professor Vibens was a rather small, bald-headed man, with a keen looking face. As I thanked the law-student and started on my story, he looked rather bored, as though wondering why I had picked on him with my tale of wonder. Before I had gotten very far he straightened up a little; and further along he pricked up another notch; and before many minutes he was tense in his chair as he listened to me. When I finished, his comment was terse, like that of a man accustomed to thinking accurately and to the point.

"Obviously you come into this world from another set of coordinates. As we are on the z dimension, you must have come to us from the t dimension—"

He disregarded my attempts to protest at this point.

"Your man Woleshensky has evidently developed the conception of relativity further than we have,

although Monpeters' theory comes close enough to it. Since I have no idea how to get you back, you must be my guest. I shall enjoy hearing all about your world."

"That is very kind of you," I said gratefully. "I'm accepting because I can't see what else to do. At least until the time when I can find me a place in your world or get back to my own. Fortunately," I added as an afterthought, "no one will miss me there, unless it be a few classes of students who will welcome the little vacation that must elapse before my successor is found."

Breathlessly eager to find out what sort of a world I had gotten into, I walked with him to his home. And I may state at the outset that if I had found everything upside down and outlandishly bizarre, I should have been far less amazed and astonished than I was. For, from the walk that first evening from Professor Vibens' office along several blocks of residence street to his solid and respectable home, through all of my goings about the town and country during the years that I remained in the *t*-dimensional world, I found people and things thoroughly ordinary and familiar. They looked and acted as we do, and their homes and goods looked like ours. I cannot possibly imagine a world and a people that could be more similar to ours without actually being the same. It was months before I got over the idea that I had merely wandered into an unfamiliar part of my own city. Only the actual experience of wide travel and much sight-seeing, and the knowledge that there was no such extensive English-speaking country on the world that I

knew, convinced me that I must be on some other world, doubtless in the *t* dimension.

"A gentleman who has found his way here from another universe," the professor introduced me to a strapping young fellow who was mowing the lawn.

The professor's son was named John! Could anything be more commonplace?

"I'll have to take you around and show you things tomorrow," John said cordially, accepting the account of my arrival without surprise.

A red-headed servant-girl, roast-pork and rhubarb-sauce for dinner, and checkers afterwards, a hot bath at bedtime, the ringing of a telephone somewhere else in the house—is it any wonder that it was months before I would believe that I had actually come into a different universe? What slight differences there were in the people and the world, merely served to emphasize the similarity. For instance, I think they were just a little more hospitable and "old-fashioned" than we are. Making due allowances for the fact that I was a rather remarkable phenomenon, I think I was welcomed more heartily in this home and in others later, people spared me more of their time and interest from their daily business, than would have happened under similar circumstances in a correspondingly busy city in America.

Again, John found a lot of time to take me about the city and show me banks and stores and offices. He drove a little squat car with tall wheels, run by a spluttering gasoline motor. (The car was not as perfect as our modern cars, and horses were quite

numerous in the streets. Yet John was a busy business man, the district superintendent of a life-insurance agency). Think of it! Life insurance in Einstein's t dimension.

"You're young to be holding such an important position," I suggested.

"Got started early," John replied. "Dad is disappointed because I didn't see fit to waste time in college. Disgrace to the family, I am."

What in particular shall I say about the city? It might have been any one of a couple of hundred American cities. Only it wasn't. The electric street cars, except for their bright green color, were perfect; they might have been brought over bodily from Oshkosh or Tulsa. The ten-cent stores with gold letters on their signs; drug-stores with soft drinks; a mad, scrambling stock-exchange; the blaring sign of an advertising dentist; brilliant entrances to motion-picture theaters, were all there. The beauty-shops did wonders to the women's heads, excelling our own by a good deal, if I am any judge; and at that time I had nothing more important on my mind than to speculate on that question. Newsboys bawled the *Evening Sun*, and the *Morning Gale*, in whose curious, flat type I could read accounts of legislative doings, murders, and divorces, quite as fluently as I could in my own *Tribune* at home. Strangeness and unfamiliarity had bothered me a good deal on a trip to Quebec a couple of years ago; but they were not noticeable here in the t dimension.

For three or four weeks the novelty of going around, looking at things, meeting people, visiting concerts, theaters, and department stores, was sufficient to absorb my interest. Professor

Vibens' hospitality was so sincerely extended that I did not hesitate to accept, though I assured him that I would repay it as soon as I got established in this world. In a few days I was thoroughly convinced that there was no way back home. Here I must stay, at least until I learned as much as Woleshensky knew about crossing dimensions. Professor Vibens eventually secured for me a position at the University.

It was shortly after I had accepted the position as instructor in experimental physics and had begun to get broken into my work, that I noticed a strange commotion among the people of the city. I have always been a studious recluse, observing people as phenomena rather than participating in their activities. So for some time I noted only in a subconscious way the excited gathering in groups, the gesticulations and blazing eyes, the wild sale of extra editions of papers, the general air of disturbance. I even failed to take an active interest in these things when I made a railroad journey of three hundred miles and spent a week in another city; so thoroughly at home did I feel in this world that when the advisability arose of my studying laboratory methods in another University, I made the trip alone. So absorbed was I in my laboratory problems that I only noted with half an eye the commotion and excitement everywhere, and merely re-collected it later. One night it suddenly popped into my head that the country was aroused over something.

That night I was with the Vibens' family in their living room. John tuned in the radio. I wasn't listening to the thing very much; I had troubles

of my own. $F = g \frac{M^1 M^2}{r^2}$ was familiar enough to me. It meant the same and held as rigidly here as in my old world. But, what was the name of the bird who had formulated that law? Back home it was Newton. Tomorrow in class I would have to be thoroughly familiar with his name. Pasvieux, that's what it was. What messy surnames. It struck me that it was lucky that they expressed the laws of physics in the same form, and even in the same algebraical letters, or I might have had a time getting them confused—when all of a sudden the radio blatantly bawled:

**"THE GOSTAK DISTIMS
THE DOSHES!"**

John jumped to his feet.

"Damn right!" he shouted, slamming the table with his fist.

Both his father and mother annihilated him with withering glances, and he slunk from the room. I gazed stupefied. My stupefaction continued while the Professor shut off the radio, and both of them excused themselves from my presence. Then suddenly I was alert.

I grabbed a bunch of newspapers, having seen none for several days. Great sprawling headlines covered the front pages:

**"THE GOSTAK DISTIMS
THE DOSHES."**

For a moment I stopped, trying to recollect where I had heard those words before. They recalled something to me. Ah, yes! That very afternoon, there had been a commotion beneath my window on the University campus. I had been busy checking over an experiment so that I might be sure of its success at tomorrow's class, and looked out rather absently to see

what was going on. A group of young men from a dismissed class was passing, and had stopped for a moment.

"I say, the gostak distims the doshes!" said a fine-looking young fellow. His face was pale and strained looking.

The young man facing him sneered derisively:

"Aw your grandmother! Don't be a feeble—"

He never finished. The first fellow's fist caught him in the cheek. Several books dropped to the ground. In a moment the two had clinched and were rolling on the ground, fists flying up and down, smears of blood appearing here and there. The others surrounded them, and for a moment appeared to enjoy the spectacle; but suddenly recollected that it looked rather disgraceful on a University campus, and after a lively tussle separated the combatants. Twenty of them, pulling in two directions, tugged them apart.

The first boy strained in the grasp of his captors; his white face was flecked with blood, and he panted for breath.

"Insult!" he shouted, giving another mighty heave to get free. He looked contemptuously around. "The whole bunch of you ought to learn to stand up for your honor. The gostak distims the doshes!"

That was the astonishing incident that these words called to my mind. I turned back to my newspapers.

"Slogan Sweeps the Country," proclaimed the subheads. "Ringing Expression of National Spirit! Enthusiasm Spreads Like Wildfire! The new patriotic slogan is gaining ground rapidly," the leading article went on.

"The fact that it has covered the country almost instantaneously seems to indicate that it fills a deep and long-felt want in the hearts of the people. It was first uttered during a speech in Walkington by that majestic figure in modern statesmanship, Senator Harob. The beautiful sentiment, the wonderful emotion of this sublime thought, are epoch-making. It is a great conception, doing credit to a great man, and worthy of being the guiding light of a great people—"

That was the gist of everything I could find in the papers. I fell asleep, still puzzled about the thing. I was puzzled, because—as I see now and didn't see then—I was trained in the analytical methods of physical science, and knew little or nothing about the ways and emotions of the masses of the people.

In the morning the senseless expression popped into my head as soon as I awoke. I determined to waylay the first member of the Vibens family who showed up, and demand the meaning of the thing. It happened to be John.

"John, what's a gostak?"

John's face lighted up with pleasure. He threw out his chest and look of pride replaced the pleasure. His eyes blazed, and with a consuming enthusiasm, he shook hands with me, as the deacons shake hands with a new convert—a sort of glad welcome.

"The gostak!" he exclaimed. "Hur-
ray for the gostak!"

"But what is a gostak?"

"Not a gostak! *The* gostak. The gostak is—the distimmer of the doshes—see! He distims 'em, see?"

"Yes, yes. But what is distimming? How do you distim?"

"No, no! Only the gostak can distim. The gostak distims the doshes. See?"

"Ah, I see!" I exclaimed. Indeed, I pride myself on my quick wit. "What are doshes? Why, they are the stuff distimmed by the gostak. Very simple!"

"Good for you!" John slapped my back in huge enthusiasm. "I think it wonderful for you to understand us so well, after being here only a short time. You are very patriotic."

I gritted my teeth tightly, to keep myself from speaking.

"Professor Vibens, what's a gostak?" I asked in the solitude of his office an hour later.

He looked pained.

He leaned back in his chair and looked me over elaborately, and waited some time before answering.

"Hush! he finally whispered. "A scientific man may think what he pleases; but if he says too much, people in general may misjudge him. As a matter of fact, a good many scientific men are taking this so-called patriotism seriously. But a mathematician cannot use words loosely; it has become second nature with him to inquire closely into the meaning of every term he uses."

"Well, doesn't that jargon mean anything at all?" I was beginning to be puzzled in earnest.

"To me, it does not. But it seems to mean a great deal to the public in general. It's making people do things, is it not?"

I stood a while in stupefied silence. That an entire great nation should become fired up over a meaningless piece of nonsense! Yet, the astonishing thing was that I had to admit that

there was plenty of precedent for it in the history of my own z-dimensional world. A nation exterminating itself in civil wars to decide which of two profligate royal families should be privileged to waste the people's substance from the throne; a hundred thousand crusaders marching to death for an idea that to me means nothing; a meaningless, untrue advertising slogan that sells millions of dollars' worth of cigarettes to a nation to the latter's own detriment—haven't we seen it over and over again?

"There's a public lecture on this stuff tonight at the First Church of The Salvation," Professor Vibens suggested.

"I'll be there," I said. "I want to look into the thing."

That afternoon there was another flurry of "extras" over the street; people gathered in knots and gesticulated with open newspapers.

"War! Let 'em have it!" I heard men shout.

"Is our national honor a rag to be muddled and trampled on?" the editorials asked.

As far as I could gather from reading the papers, there was a group of nations across an ocean that was not taking the gostak seriously. A ship whose pennant bore the slogan had been refused entrance to an Engtalian harbor because it flew no national ensign. The Executive had dispatched a diplomatic note. An evangelist who had attempted to preach the gospel of the distimmed doshes at a public gathering in Iland had been ridden on a rail and otherwise abused. The Executive was dispatching a diplomatic note.

Public indignation waxed high. De-

rogatory remarks about "wops" were flung about. Shouts of "Holy war!" were heard. I could feel the tension in the atmosphere as I took my seat in the crowded church in the evening. I had been assured that the message of the gostak and the doshes would be thoroughly expounded so that even the most simple-minded and uneducated people could understand it fully. Although I had my hands full at the University, I was so puzzled and amazed at the course that events were taking that I determined to give the evening to finding out what the "slogan" meant.

There was a good deal of singing before the lecture began. Mimeographed copies of the words were passed about, but I neglected to preserve them, and do not remember them. I know there was one solemn hymn that reverberated harmoniously through the great church a chanting repetition of "The Gostak Distims the Doshes." There was another stirring martial air, that began: "Oh the Gostak! Oh the Gostak!"—and ended with a swift cadence on the Gostak Distims the Doshes! The speaker had a rich, eloquent voice and a commanding figure. He stepped out and bowed solemnly.

"The gostak distims the doshes," he pronounced impressively. "Is it not comforting to know that there is a gostak; do we not glow with pride because the doshes are distimmed? In the entire universe there is no more profoundly significant fact: the gostak distims the doshes. Could anything be more complete, yet more tersely emphatic. The gostak distims the doshes!" Applause. "This thrilling truth affects our innermost lives. What would we do

if the gostak did not distim the doshes? Without the gostak, without doshes, what would we do? What would we think? How would we feel?—"Applause again.

At first I thought this was some kind of an introduction. I was inexperienced in listening to popular speeches, lectures, and sermons. I had spent most of my life in the study of physics and its accessory sciences. I could not help trying to figure out the meaning of whatever I heard. When I found none I began to get impatient. I waited some more, thinking that soon he would begin on the real explanation. After thirty minutes of the same sort of stuff as I have just quoted, I gave up trying to listen. I just sat and hoped he would soon be through. The people applauded and grew more excited. After an hour, I stirred restlessly; I slouched down in my seat and sat up by turns. After two hours I grew desperate; I got up and walked out. Most of the people were too excited to notice me. Only a few of them cast hostile glances at my retreat.

The next day the mad nightmare began for me. First there was a snow-storm of "extras" over the city, announcing the sinking of a merchantman by an Engtalian cruiser. A dispute had arisen between the officers of the merchantman and the port officials, because the latter had jeered disrespectfully at the gostak. The merchantman picked up and started out without having fulfilled all the Customs requirements. A cruiser followed it and ordered it to return. The captain of the merchantman told them that the gostak distims the doshes, whereupon the cruiser fired twice and sank the mer-

chantman. In the afternoon came the "extras" announcing the Executive's declaration of war.

Recruiting offices opened; the University was depleted of its young men; uniformed troops marched through the city, and railway trains full of them went in and out. Campaigns for raising war loans; home-guards, women's auxiliaries, ladies' aid societies making bandages, young women enlisting as ambulance drivers—it was indeed war; all of it to the constantly repeated slogan: "The gostak distims the doshes."

I could hardly believe that it was really true. There seemed to be no adequate cause for a war. The huge and powerful nation had dreamed a silly slogan and flung it in the world's face. A group of nations across the water had united into an alliance, claiming they had to defend themselves against having forced upon them a principle they did not desire. The whole thing at the bottom had no meaning. It did not seem possible that there would actually be a war; it seemed more like going through a lot of elaborate play-acting.

Only when the news came of a vast naval battle of doubtful issue, in which ships had been sunk and thousands of lives lost, did it come to me that they meant business. Black hands of mourning appeared on sleeves and in windows. One of the allied countries was invaded and a front-line set up. Reports of a division wiped out by an airplane attack; of forty thousand dead in a five-day battle; of more men and more money needed, began to make things look real. Haggard men with bandaged heads and arms in slings appeared on the streets; a church

and an auditorium were converted into hospitals; and trainloads of wounded were brought in. To convince myself that this thing was so, I visited these wards, and saw with my own eyes the rows of cots, the surgeons working on ghastly wounds, the men with a leg missing or with a hideously disfigured face.

Food became restricted; there was no white bread, and sugar was rationed. Clothing was of poor quality; coal and oil were obtainable, only on government permit. Business were shut down. John was gone; his parents received news that he was missing in action.

Real it was; there could be no more doubt of it. The thing that made it seem most real was the picture of a mangled, hopeless wreck of humanity sent back from the guns, a living protest against the horror of war. Suddenly someone would say: "The gostak distims the doshes!" and the poor wounded fragment would straighten up and put out his chest with pride, and an unquenchable fire would blaze in his eyes. He did not regret having given his all for that. How could I understand it?

And real it was when the draft was announced. More men were needed; volunteers were insufficient. Along with the rest, I complied with the order to register, doing so in a mechanical fashion, thinking little of it. Suddenly the coldest realization of the reality of it was flung at me, when I was informed that my name had been drawn and that I would have to go!

All this time I had looked upon this mess as something outside of me; something belonging to a different

world, of which I was not a part. Now here was a card summoning me to training camp. With all this death and mangled humanity in the background, I wasn't even interested in this world. I didn't belong here. To be called upon to undergo all the horrors of military life; the risk of a horrible death, for no reason at all! For a silly jumble of meaningless sounds.

I spent a sleepless night in maddened shock from the thing. In the morning a wild and haggard caricature of myself looked back at me from the mirror. But I had revolted. I intended to refuse service. If the words conscientious objector ever meant anything, I certainly was one. Even if they shot me for treason at once, that would be a fate less hard to bear than going out and giving my strength and my life for—for nothing at all.

My apprehensions were quite correct. With my usual success at self-control over a seething interior, I coolly walked to the draft office and informed them that I did not believe in their cause and could not see my way to fight for it. Evidently they had suspected something of the sort already, for they had the irons on my wrists before I had hardly done with my speech.

"Period of emergency," said a beefy tyrant at the desk; "no time for stringing out a civil trial. Court-martial!"

He said it at me vindictively, and the guards jostled me roughly down the corridor; even they resented my attitude. The court-martial was already waiting for me. From the time I walked out of the lecture at the church I had been under secret sur-

veillance; and they knew my attitude thoroughly. That is the first thing the president of the court informed me.

My trial was short. I was informed that I had no valid reason for objecting. Objectors because of religion, because of nationality, and similar reasons, were readily understood; a jail sentence to the end of the war was their usual fate. But I admitted that I had no intrinsic objection to fighting; I merely jeered at their holy cause. That was treason unpardonable.

"Sentenced to be shot at sunrise!" the president of the court announced.

The world spun around with me. But only for a second. My self-control came to my aid. With the curious detachment that comes to us in such emergencies, I noted that the court-martial was being held in Professor Vibens' office; that dingy little Victorian room, where I had first told my story of traveling by relativity and had first realized that I had come to the t -dimensional world. Apparently it was also to be the last room I was to see in this same world. I had no false hopes that the execution would help me back to my own world, as such things sometimes do in stories. When life is gone, it is gone, whether in one dimension or another. I would be just as dead in the z dimension as in the t dimension.

"Now, Einstein, or never" I thought. "Come to my aid, O Riemann! O Lobatchewsky! If anything will save me it will have to be a tensor or a geodesic."

I said it to myself rather ironically. Relativity had brought me here. Could it get me out of this?

Well! Why not?

If the form of a natural law, yea,

if a natural object varies with the observer who expresses it, might not the truth and the meaning of the gostak slogan also be a matter of relativity? It was like making the moon ride the tree tops again. If I could be a better relativist, and put myself in these people's place, perhaps I could understand the gostak. Perhaps I would even be willing to fight for him or it.

The idea struck me suddenly. I must have straightened up and some bright change must have passed over my features, for the guards who led me looked at me curiously and took a firmer grip on me. We had just descended the steps of the building and had started down the walk.

Making the moon ride the tree tops! That was what I needed now. And that sounded as silly to me as the gostak. And the gostak did not seem so silly. I drew a deep breath and felt very much encouraged. The viewpoint of *relativity* was somehow coming back to me. Necessity manages much. I could understand how one might fight for the idea of a gostak dismissing the doshes. I felt almost like telling these men. Relativity is a wonderful thing. They led me up the slope, between the rows of poplars.

Then it all suddenly popped into my head; how I had gotten here by changing my coordinates, insisting to myself that I was going *upwards*. Just like making the moon stop and making the trees ride, when you are out riding at night. Now I was going upwards. In my own world, in the z dimension, this same poplar was *down* the slope.

"It's downwards!" I insisted to

(Continued on page 129)

SERVICE FIRST

DAVID H. KELLER, M.D.

Illustrated by MOREY

To the question "And how large is the universe?" Dr. David Keller might well have answered, "It's no larger or smaller than the nearest dream." Here, in Service First he gives us Henry Cecil a man whose dreams all fall on the right side of practicability and whose solutions result in some pretty "solid" castles in the air.



Copyright 1931 by Roder Science Pub. Inc.

Science Fiction Classics

HENRY Cecil left the office at the usual time, fought his way to the subway, stood for tortured minutes, pressed on all sides by sardined humanity, struggled till he escaped out of the train to the open air, walked through irritable thousands to the apartment house where he lived, entered the elevator, which normally accommodated six, but on this trip held ten, left the elevator at the twenty-second floor and opened the door to his one-room apartment. His wife, a stenographer, had won her way home ten minutes earlier than he had and was heating the supper, hastily purchased *en route* from her office. She had gone through the daily mail and had news of the most serious nature to tell her husband. She hated to do it.

"They have raised the rent again, Henry."

He took off his hat, threw his coat on a chair, kissed her and went to the built-in cubicle that served for a bathroom. There he washed and prepared for supper.

His first comment was, "These beans are better than usual, Arline."

"I think so. I bought them at a new store. Running a special on baked beans today. I saved three cents on the supper."

"That is good. Now, what do they want next month?"

"Seventy-five dollars."

"Fifteen more than we're paying now."

"Yes—only fifteen more."

He ate the beans slowly. After his half was all gone, he took a crust of bread and wiped the plate carefully. He drank a half glass of water. Then,

pushing the plate away, he gave his decision:

"This is the end of trying to live in a respectable neighborhood. We have sacrificed everything we could without completely lowering our efficiency as workers. There is only one thing to do and that is to move."

"I wish we could stay here."

"So do I. I would like to spend a week in the country. I would like a car of some kind. It would be nice to be my own boss and make enough so you would not have to work. There are a lot of things I can wish, but that does not get us anywhere. I asked for a raise today and came near being discharged. The only way I can see, the only possible answer we can give, is to leave and go and live with the foreigners. Or," and he looked around the apartment, "perhaps we can take in a boarder."

"That is your old-time humor, Cecil."

They both laughed, and he, encouraged by her smiles, went on:

"We have a wonderful, fine, modern, one-room apartment. Last year there were over a thousand apartment houses built in New York City and all of them were divided into one-room apartments. We are imitating the bee; we are living like the termite. And now they want seventy-five dollars a month for this. A room that is a bedroom by night, a parlor by day and an eating place morning and night. We have closets that are classified as kitchen, bath and clothes rooms. When we take the bed out of the wall, there is hardly any space left to walk around it. When your mother comes, we give her the bed, you sleep on the fire-escape and I recline like a

pen-knife in the bathtub. We have denied ourselves all the luxuries and most of the necessities, in order to live in a nice neighborhood, where we do not know a single neighbor, and now they add fifteen dollars to the rent."

"Nothing is free in life!" exclaimed the wife sadly.

"Yes, something is. We can go up to Central Park and take all the air we want for nothing. Say, that is an idea! The air is free. If only we could live there!"

"Why not invent an air home, Cecil? You used to have the most wonderful dreams. I do not want to hurt your feelings, but I really thought at one time, before we married, that some of your inventions would amount to something."

"I lacked two things, my dear. One was money and the other was technical knowledge. I never could stop work long enough to really patiently labor at an invention till it was marketable. Even then I would need to possess a greater scientific knowledge than I have, to even sell the idea. My dear, when you married me, you made a mistake. You should have married a laborer, a plumber, a plasterer or a carpenter instead of a white collar clerk, who works at a desk by day, dreams of inventions by night and, in the meantime allows his wife to work because otherwise he cannot as much as provide a one-room home for her. You are a clever woman, but when you married your foot slipped."

Arline started to cry. The work had been hard that day. The notice of increased rent was too much for her, so she easily passed from hysterical laughter to uncontrollable tears. Cecil pat-

ted her gently on the head as he stood beside her chair:

He whispered, "Don't cry, Mama."

And then he threw his fist into the air and went on:

"Papa will find a way out for you. You just trust Papa."

That was a way they had of calling themselves Mama and Papa. They had no child. They knew that unless a miracle happened, they never could have a child. Not in a thousand years could they finance a baby in the family. Their union was no more a family than their apartment was a home. When they used the words home, Papa and Mama, they spoke in the same sense as they did when they talked about Heaven and a trip to France.

So, all that night Henry Cecil lay sleepless by the sleeping woman on the bed that was let down out of a hole in the wall. He had promised her that he would find a way. He had never failed her. Rash had been his statement; almost impossible his words, that he would find a way—but he had said it and he would have to make good. Sleep deserted him; he went into every possibility and found nothing but a closed gate, a brick wall, a hopeless future. Desperate, he dressed an hour earlier than usual, went down and bought a morning paper, and returning to the apartment, sat down to read it while waiting for his wife to respond to the ever-present threat of the alarm clock.

When he first glanced over the paper, Cecil thought that the news was of the usual uninteresting nature. The same things were happening. Three gangsters had been taken out for rides and killed, but the Commissioner

was confident of finding the murderers at once and threatened to dismiss a dozen detectives if they failed to deliver the guilty parties. Several society women had secured divorces and one had married for the third time. The champion home-run hitter had struck out. At the Conference of Nations, the Seventh Agreement for the paying of the war debt had failed to secure the approval of Iraq, therefore everything had to start again. Ah! here was some real news.

Jones and Jenkins had broken the air record for continuous flight, having remained in the air thirty-seven days and six hours. During this time they had been supplied with gas, oil, and entertainment by the service plane of The Universal Air Corporation. Continuous flights in any direction would soon be a possibility. Service Stations in the Air! Why come to earth to refuel? A non-stop flight around the earth was being arranged for. That was news. Cecil was properly thrilled. And here was something else.

The noted President of Universal Air Corporations in conflict with his landlord, Percival Provens, it seemed, rented a twenty-five-room apartment on Park Avenue. Though many times a millionaire, he had one peculiarity—a dislike to own property in New York City. He had rented this apartment and now his three-year lease was up and the landlord was asking two hundred and fifty thousand dollars a year more rent. Provens had refused to sign the lease. He stated that he was already paying more than the apartment was worth and that one of the greatest evils of the city was the high rentals. There was a statement from the man

who owned the apartment house, showing that he was not making five per cent on his investment. Another statement from the head of the Realtors' Association to the effect that rents were no higher in New York City than they were elsewhere, considering the fact that the demand for apartments was so far in advance of the supply.

"Well, well!" exclaimed Henry Cecil to himself as he put down the paper and went out to the little, diminutive kitchenette and put on the oatmeal. "This rent problem seems to hit both the rich and the poor. Now I am sure that Percival Provens could easily pay that increased rent, but it seems to him to be an injustice. He, evidently, is mad at the idea that someone is trying to rob him. There goes the alarm clock. The parlor clock seems late. Pshaw! wonder why they call it a parlor clock? Wedding present. Old-fashioned aunt of Arline's sent it to her. Wrote and said she was sending us a parlor clock. Wonder how it would be to live in a house with a parlor? Priced those clocks. The old lady spent twenty dollars for it and it goes years without winding. Simply attach a plug to an electric light socket. That would be a good idea for a piece of machinery. Great to have a watch like that. Mine is always running down. Forget to wind it."

In a few minutes Arline came out to the kitchenette. The bed had been put back in the wall, and the table taken out of the wall and spread for breakfast. Two dishes of oatmeal, two cups of tea, two pieces of bread and butter.

Done! Now for the fight in the subway.

"I see," said Henry as they waited for the elevator, "that Percival Provens has had his rent raised."

"Who is Percy? A friend of yours? Better find out what he is going to do. Perhaps we can take him for a boarder and have him use the clothes closet," was Arline's caustic reply. "Better think fast, Henry, dear. We have to give the landlord an answer by the end of the week. You promised me we could stay if we wanted to."

"I am thinking about it," replied her husband, kissing her good-bye and dashing into the subway.

When he was in the daylight again, he saw a crowd gathered in front of the office building where he worked. He joined it and finally found what it was all about. A man was selling rubber dolls that could be blown up.

"Blow 'em up and see 'em stick er tongues out," he was shouting.

Cecil reached over and handed the man a dime, grabbed a doll and rushed to the elevator. As soon as he arrived at the office he went to the head of the department and asked to have the day off.

"Mother-in-law dead?" asked the man.

"No. I just have business."

"Cannot spare you today."

"I'll have to go anyway."

"If you go, you're fired."

"All right, and you can give me my time. It's a dog's work for a dog's wages, anyway. I could earn more with a shovel, working in the subways."

Half an hour later Cecil was on

the street, jobless, with his hands in his pockets and nothing else. He went at once to the central office of Universal Air Corporation. In one way and another he finally reached the secretary of the President. This individual was supercilious and arrogant. He finally agreed to make an appointment for Cecil to see the President at ten o'clock on the thirty-first of the following February. The man, without a job, walked out. Ten minutes later the secretary received word that his wife had been hurt and was in the Methodist Hospital. Naturally, he reached for his hat and hurried to her side. As he did so, Cecil passed him. Three minutes later the hopeful inventor was standing at the side of the President of Universal Air Corporation.

"I just had to see you, Mr. Provens," he said. "I could not wait for an appointment. We have a great deal in common, and I wanted to talk to you about it."

"Did you see my secretary?" thundered the busy official.

"I did. He, naturally, refused me an interview. He left the office soon after and I came in."

"There is nothing wrong with your nerve!"

"No. But listen to me. I had my rent raised yesterday and so did you. You probably feel as sore at the real-estate owners of this town as I do. Now, you are in the airplane business. Your company makes them. You want to see as many planes sold the next five years as Ford used to sell automobiles. I have read your articles in which you state that you want the nation to become air-conscious. Am I right? Now, suppose I give you a few

ideas that will help you sell planes and, at the same time, give you a very sweet revenge on these property owners? Suppose I tell you how to take so many people out of the apartments that the realtors will be begging folks to rent their places? Would that be worth while?"

"You must be another inventor crank."

"I am, but I have something worth while. Will you listen to me? Will you give me half an hour?"

Under ordinary circumstances Provens would have had Cecil thrown out of the room. But he had a ten o'clock appointment with a man whom he disliked. Here was a way of escape from a disagreeable interview. He called to one of his assistant secretaries and cancelled the engagement and gave Cecil one hour of the morning.

"Now, here is my idea," said Cecil, sitting down on a chair right across the table from Provens. "Airplanes are cheap. Fifteen hundred buys one and twenty-five hundred buys a larger one with a fairly large cabin. I want you people to build a safe plane with a wonderful engine and as large a cabin as you can. The maximum cost ought to be three thousand or less. Sell it on monthly payments. Then fix up the cabin so two persons can live in it. The papers say that a plane can stay in the air indefinitely, so long as it can be serviced. I see that your company is thinking of building air service stations. Am I right? Now, when a young couple want to marry, they simply buy one of your planes. They live in it. All the comforts and necessities for them and the plane are supplied at a nominal cost from your service stations. They have no rent to

pay. They own their own homeplane. How is that? In different parts of the city, erect large tubes. They fly to these tubes. The service includes parking privileges for the day. The men go down the tube to the ground in a circular escalator. When they are through work, they go up the tube, enter their plane, and spend the night in the air. If they want to soar, they can do so. If, on the other hand, they want to go to one of your air garages on the outskirts of New York, they can simply fly out there and alight on one of your aerial masts. The cost of the plane includes a certain amount of free service, say, for one year.

"You sell, not only the plane, but service. Of course, the things like gas and oil and food and entertainment would have to be paid for just as they are now.

"I know what your objections are going to be. You will say that the cabins cannot be furnished. That has been thought of. See this doll? It has a tongue, but when there is no need of that tongue, it remains in the mouth. Now, suppose the child that owns this doll wants the tongue to stick out, all he has to do is to blow some air up the doll's leg and out comes the tongue. That is the way I want the furniture of this cabin to be; made out of rubber. Man and his wife come in the plane and want a little supper. They press a button and the rubber table is inflated and comes up from the floor. Supper over, they simply deflate it by pressing another button. Time to go to bed, another button, and up comes the bed out of the floor or the side of the wall. Sleep over, the air is let out of the bed and it goes back. Have the doors the same

way. Press a button; out goes the air and the door opens; press another button; in goes the air and the door blows up and fills in the doorway."

Percival Provens jumped out of his chair.

"You stop talking till I come back," he called as he left the room.

"And that is the end of my interview," moaned Henry Cecil to himself sadly. "Don't that beat all! Going nicely, and said just one word too much. I wonder what it was?"

But the President soon returned with three well-dressed young men at his heels. He introduced them to Cecil, and, ending, said, "These men are from my Department of Invention. Folks used to have a peculiar idea of inventors. Long-haired, solitary chaps, who gathered egg on their vests and starved to death. That is all old-fashioned. Practically no invention of today is the work of one man. I have an idea, just one idea, and I give that idea to the Inventors in that special department and each one works on different parts of it, and finally we have the new instrument and it is really the work of a dozen fine chaps like those you see here. I brought them here to listen to you. Because you have an idea. You don't have one idea—you have a dozen. I want them to take notes of your lecture. Start right at the beginning and tell them all about it."

Cecil breathed a sigh of relief. "I thought you would not like it," he said.

"Like it! Man, it's revolutionary. We will show folks how to live! The ground is rather well bought up, but the air is still free. All we have to do is to keep quiet about this till every feature of it is patented and then we

will take those poor people out of their apartments and give them a chance to move around in the air and, at the same time, be in their own homes. Will they do it? I'll say they will. When automobiles were so popular, do you remember how they used to go across the continent and camp out? I will make it possible for them to do the same thing with a plane. Every town of any size will have a service station for tourists to land on for the night. Service. SERVICE FIRST. What care I how little I make on the first price of the plane so long as I can sell service! How about the safety razor? Do you remember the time when they gave them away just to get new customers for the blades? Go on talking. Empty your mind of the whole matter. Talk as you never talked before. Fast! Boys, listen to him. As he talks, make notes, drawing, put down question marks about points you do not understand. This is the dawning of a new day for our corporation and for the poor devils who have had to rent their homes from rapacious landlords. What a revenge! Thought they could get a quarter million more a year from me. Now it will cost them billions."

"Now," said Cecil, "suppose we have a man and wife living in one of these planes, the cabin of which is fitted with rubber, inflatable furniture? Night has come. They inflate the bed and go to sleep. They know their plane is safe till morning, because it is on one of the service station platforms of the Universal Air Corporation. The next morning they jump out of bed and press a button and the bed collapses. Get the idea? They press another button and up

comes the little breakfast table. They look over the weekly bulletin and select breakfast No. 27, served to two persons for twenty-three cents. They phone down to the restaurant of the service station and up comes the breakfast through the tube. It is in a little cylinder, all ready to serve. The wife opens the cylinder, takes out the paper dishes and spreads the table. Breakfast over, she puts the paper dishes and napkins back in the cylinder and sends it back on the reverse circuit. The man finds he has a few minutes of leisure, so he turns on the service radio and listens to the latest news, furnished by the service station. He then looks at the various dials and finds he needs five gallons of gas and a quart of oil. He sends the necessary signal and at once this is run into the tanks. He then presses a button which starts his engine and releases him from the service station mast. While his wife is dusting the cabin, he pilots the plane to the service station that is nearest to his work. Being a regular customer, he has a regular place to moor to. He fastens to this by means of a magnetic collar and then presses another button. A rubber door opens by collapsing and a rubber landing platform spreads out by inflation. He and his wife walk out on this platform; he turns around, shuts the door by inflating it and then he and his wife reach the ground by stepping on one of the platforms of the circular escalator.

"Gentlemen. Can you visualize that? I can. Now the man and his wife work all day. Night comes. They go to the base of the service station and step on a platform of the ascending spiral escalator. At the level of their

plane they step off and enter their home. Perhaps they have supper there; or it may be they prefer to take a ride through the air to Philadelphia or Boston. No matter where they go, they will find every form of service at Universal Air Service Stations. Meals of the best grade at a low price, amusements, information of any kind, gas, oil, connection with the ground, electricity, a simple means of disposing of their wastes, no dishes to wash. Every form of duty and work required in the small home will be furnished by the Corporation at nominal prices to all purchasers of their airplanes.

"I spoke of amusements. Radio and television can easily be provided for. A daily news service, education for the children over the television and radio, in fact, everything that makes life easy and comfortable will be furnished. It will cost no more to live than it does now, because the service, supplied to thousands of regular customers, can be furnished at greatly reduced rates. Every plane owner will have a fair idea of what his living is costing him, and the bill for the entire service can be paid monthly, just like a telephone bill or a charge account at a store.

"I feel that the construction of the new style of house-planes will be a simple matter. The novelty will be in the metal masts, or columns, with their platforms for mooring the planes and supplying them with service. I believe that a magnetic plug to attract a collar on one side of the plane will be necessary. Through this plug will pass a number of tubes—one for gas, one for oil, another for electric service, and larger ones for the food canisters and waste disposal service. The planes will be uniform in con-

struction and the plugs will be uniform, so it will not matter in what city or to which service column your plane is fastened. The service will be equally available. Of course, it will be necessary in every large city to have a field for service columns for local use and another to care for the transient, or tourist trade, but wherever a homeplane of the Universal Air Corporation stops for the night, it will be well cared for, efficiently serviced and politely sent on its way the next day. Think of it! Everything that is needed in the home. Everything! All provided by one company and paid for once a month. No rent. No sub-way. No poisoning gases in the canyons of the city. A nice trip every night or, if desired, a quiet evening at home five hundred feet above the ground.

"Some day you are going to get rid of the gasoline question. I have a clock that will run a year without winding. Why cannot you do that with an airplane engine? Perhaps not yet, but how soon? I forgot the electric refrigerator, and the rubber, inflatable bathtub. For those who have babies, a rubber kiddie-coop, to be attached to the side of the plane. Absolute safety, absolute sanitation, no laundry, no dishwashing, no housecleaning, for there will be no dust. No cooking. A moving picture or a talkie in the plane whenever it is wanted and costing no more than tickets to the average theater would cost for two."

"Stop! For goodness sake, stop!" thundered Percival Provens. "You have given us enough new ideas now to keep us busy for the next two years. The damnable thing is that

every one of your ideas is practicable, and we would have planned every one by ourselves long ago had we a single man in our department of invention who had imagination instead of technical brains. Gentlemen, take your notes and prepare a fifty thousand word statement of this innovation in air living. Draw your plans. Have it all ready for me to submit to my technical board of control by the end of one week. In all the work remember that our motto is going to be SERVICE FIRST. We want to tell the public that we are not selling planes or homes, but we are only placing them in a position where they can be entitled to our service. That is the big idea. Mr. Cecil, I know that your position is so important that you will not consider a place under me, but—"

"Let me be honest with you, Mr. Provens," was the startling reply. "Up to this morning I was a clerk in one of the business offices of a chain store corporation. I received one hundred and twenty-five a month. This morning I asked for some time off so I could have this interview with you. I was at once discharged. So, I am a man without a job, and unless I can get another, I will be without a place to sleep."

"What can you do, Mr. Cecil?"

"Keep books. That is what I do for a living, but, for pleasure, I dream. I call it inventing, but so far I have never patented anything. I just dream of all kinds of things that will make it easier for man to work and woman to do her housekeeping faster, so she will have more leisure for the finer things in life. Perhaps you noticed the idea of the paper napkins and dishes

sent to the plane with every meal? Dinner over, put all the soiled papers back in the metal cylinder. You do not even have to move the table back. Just press a button and it is deflated and sinks back into the hole in the floor."

"I need a man like you in my office!" thundered the great man. "Every man that is working for me at a big salary is a go-getter, a doer, a man of action and determination. I need a dreamer to complete the combination. I will give you a desk right here, in my private office. You can select it. Your name will be on the desk. You can have a flower vase if you wish. A private stenographer. All you have to do is to sit at that desk as much as you want to and dream. Dictate those dreams, even though they are nightmares to your steno. Get me? Put the typed dreams on my desk, and draw fifteen thousand a year, and just as soon as we make the first homeplane, I am going to give it to you with free service for the rest of your life. Have you anyone in mind for a stenographer?"

"Yes, sir. I think that my wife will do very nicely."

"I thought so! A dreamer. Gets fifteen grand a year and thinks he can have his wife go on working. I have a woman in the office who is fifty years old and cross-eyed, but how she can take dictation! Cecil, that woman is yours. If you are a man, go and tell your wife she is fired. Take this five hundred dollar bill and treat her to a new suit, fur coat, dinner, and tell her you earned it by dreaming. And you will come back tomorrow? What would we do if you forgot what it was all about?"

"Oh! I will come back," and Hen-

ry Cecil rushed for the door. On the way out he met the secretary. One man glared, but the other simply grinned. Out on the pavement, a man was selling rubber dolls. Blow them up and their tongues stick out. Half a million workers had passed that man since eight o'clock. They simply saw a man selling rubber dolls.

Henry Cecil saw more. That was because he was a dreamer.

He rushed to the office where Arline worked. Stenographers were not in the habit of being hugged and kissed in front of everybody. Arline liked it in a way and then again she did not like it. Cecil did not care. He had her hat on and before she knew what was the matter, they were out in the hall, waiting for an elevator.

"Are you sick, Henry Cecil?"

"You bet I am; love-sick. I have at last commercialized a dream, turned a vision into cash. We do not have to move till we go into our air home. Where do you want to eat and what clothes do you wear during the next six months? I have a new boss, and he wants me to spend five hundred on you before the end of the day. He says that I can have a stenographer all of my own. Do you want the job?"

The woman turned and faced her husband. The fact that the elevator had come and gone made no difference to her.

"Henry Cecil! Are you drunk? What is the job? How much do you get a year! What did you do?"

"I am going to draw fifteen thousand a year, and, just as soon as it can be arranged, we will have full maintenance. All I have to do is to sit

at a desk and dream and dictate the dreams to a steno."

"I will be the steno!" whispered Arline. "From what I know of your dreams, I would not think of your dictating them to any other woman, and certainly not if you make fifteen thousand. I tell you what we'll do. Go and buy yourself a half dozen neckties."

As quietly as possible, the Universal Air Corporation bought land in New York City. Most of the property was covered with old tenement houses and some with tin cans and goats. In over a dozen places antiquated skyscrapers would have to be torn down. Over in Long Island, in New Jersey and portions of Connecticut and along the Hudson large sections were purchased. Enormous contracts were entered into with the Bethlehem Steel Works. New airplane manufactories were constructed. Within a month a hundred million was spent. The outlay for the year called for ten times that much.

In the meantime, not a word leaked out in regard to the ultimate reason for this apparently reckless spending of money. The stock in Universal Air dropped heavily. It was rumored that their finances were in a desperate condition. After months of low prices it began to skyrocket. At last it was selling for five hundred a share and no offers. Percival Provens and his associates had made nearly a billion dollars by clever manipulation.

Meantime, steel towers began to rise here and there, in the city and all around it. On a city lot a tower, six hundred feet high, would be constructed. All the rest of the lot would be open to the air and sunlight. A thousand questions were asked as to the

purpose of this new style of building. All of the thousand questions were unanswered. Out in the country these towers stood in rows, in companies, almost in regiments, but in every instance there was a large area of unoccupied air. At regular distances on the tower peculiar projections appeared.

The Universal Air Corporation had suspended the selling of planes, pending the completion of their new design. Other manufacturers of planes went wild over the prospect of rushing their competitor out of business. The stock market see-sawed like a child's plaything. And then, simultaneously, in five hundred newspapers all over the nation, appeared a series of full-page advertisements.

"Why pay rent? Do you want to live in the air?

"Are you tired of confinement in an apartment?

"Then why not buy an air home and move whenever you please? Let Universal Air Corporation solve the housing problem for you. Live in the air and come down whenever you want to. Buy a plane and be your own landlord.

"We sell the plane and furnish the service. We think that our plane homes are wonderful, but our motto is going to be:

SERVICE FIRST

"Everything you need for your comfort and the proper functioning of your home will be supplied at our *SERVICE FILLING STA-*

TIONS at a low cost on a monthly charge account.

"We are prepared to place one million families in air homes in the next year.

WILL YOUR FAMILY BE ONE?

"Sample homes are open to inspection at five hundred of our largest cities. Air service stations will be built according to the distribution of sales.

"If you have a plane home, you can go anywhere and find service and security and a home at one of our service stations.

WHY PAY RENT?"

The advertisement took the nation by storm. It was the first intelligent effort to solve the housing problem of the great cities. During the first week of the offering of the sample planes to inspection, police protection was necessary. The real estate men saw the danger. They formed a pool and secretly placed orders for the entire first year's production. They could buy these million homes, scrap them and still be money ahead at the end of the year. But Cecil had anticipated this and had advised Provens to only take orders from *bonafide* customers and write in the article of sale the statement that the plane reverted to the company if the purchaser failed to live in it.

Foiled in this attempt, the real-estate barons went to Congress. The competition, they claimed, was unfair. Up to that time, no family had been able to survive without either owning

or renting land in some form. The wealth of the cities, the prosperity of the nation largely depended on taxes on land and property. What would be the result if the majority of the people left the land and went to live in the air? Did not the air belong to the land below it? They referred to the Supreme Court decision of *Baron vs. Strumples*, in which damages had been awarded for trespass by a plane which flew over a man's house and damaged the roof.

The air, they claimed, was not free. The air belonged to someone, and if that was the case, then it was the property of the landowners. Competition in housing was welcomed, but it must be equitable. A bill was introduced into Congress, making a state and national air-tax possible, to be paid by the owner of the airplane, not to exceed ten percent per annum on the cost of the plane.

By the time this bill was introduced, a million planes had been sold and ten million orders received. That meant eleven million families that were interested, at least twenty million voters. They simply formed a lobby, financed by the air interests. The bill never came out of the committee. It died there. There was only one thing for the property owners in the large cities to do, and that was to reduce the rentals to a point where they were able to compete with the cost of operating an air-home. Slowly, this was done, but even at the attractive rentals no one wanted to live in an apartment when he could live in a plane.

Henry Cecil kept on dreaming. In these dreams he followed one course. He imagined every possible thing that he needed in his air-home to make life

pleasant for himself and his wife, and then he dreamed of how these needs could be supplied. Thus, he was able to make millions of little families content and millions of little wives happy. For example, he saw the necessity of companionship, and thus dreamed of a club airship. The air communities had air hospitals, with medical service supplied at cost. Every thousand air-homes had the services of two air dental clinics. Air kindergartens and schools were arranged for as the demand for them grew.

For many generations the American citizen had been accustomed to owning his own home. When the time came that density of population made individual ownership impracticable, the automobile furnished gratification for the desire to possess property. The idea of air-homes combined the old and the new longings. The suggestion of Universal Air Corporation, that everyone could actually own his own home and take that home with him like the folded tent of the Arab, captivated the public imagination. In every way possible, the Corporation made it easy for families to buy, but had it been hard, the Common People would still have wanted to own their own air-homes.

After the first million had been made and sold, several styles were placed on the market. There was a variation in size, motor power and the quality of interior furnishings.

Two things were alike on all of the planehouses, no matter how much they cost. There was no place provided for servants. Cecil had fought for that point. He had argued that the primary purpose of the planes was to make homekeeping easy for the wife

whose husband had a moderate income. The household work was reduced to a minimum. If a wife was so rich and so indolent that she did not want to do even that little, she and her family ought to live in a city apartment with servant's quarters. The other point of uniformity was the connection and service tubes. A fifty thousand dollar air-home had the same connection that a twenty-five hundred dollar one had. Each plane had meals serviced through the same kind of a tube in the same kind of a cylinder, even though one meal might cost twenty dollars and the other twenty-three cents. There was no difference in the air service stations, the rich and poor had to go together. There was a difference in the home stations, but this was based on other social standings than financial ones. For instance, there were home stations where all the plane owners were college graduates. Others were patronized by groups of middleaged childless couples, while still others were reserved for those with young children. But in no case was the distinction a monetary one.

The constant grade slogan of the company was SERVICE FIRST. The next advertising motto was SAFETY FIRST. It was realized that no one wanted to live in the air if he or she had to be worried all the time for fear of dying on the ground. Consequently, every known safety device was used in the construction of these air-homes and many additional features were invented that were absolutely new. The factor of safety was stressed. Every family received an insurance policy to cover any accident received while occupying the air-home, either while it was actually moving through the air or while

it was resting on a service station. Accurate statistics were compiled after the first year, and it was shown that life and limb were safer in the air than on the ground.

So, the American public became air-conscious. It became the smart thing to live in the air. The men boasted of mileage made during their off hours and vacations. The women talked to each other about the excellence and cheapness of the meals served. The very fact that their homes could be easily moved in any direction made the air dwellers more glad to remain in one place. They began to enjoy the same scenery. They started to love the beautiful sunsets. Of their own accord, they secured injunctions against advertising balloons that threatened to disfigure the sky, as the old signboards had disfigured the public roads five hundred feet below them.

And, finally, the Universal Air Corporation thought, through the dreams of Henry Cecil, of the aesthetic side of life. He thought of an invention whereby the cold type of a printed page could be turned into beautiful spoken English, and at once to the other service was added a circulating library. All that an air-home owner had to do was to phone to the library that he wanted to hear a certain book. At once that book was automatically run through the audiphone and read aloud to him. He could sit on the pneumatic porch on a summer's evening and look at the sunset gilding the clouds and, at the same time, through the earphones, hear the latest novel or one of the world's classics. Music was supplied the same way. Thus, three mottoes were constantly observed:

Service First, Safety First, and Happiness First.

It meant something for a man and his wife to move into an air-home.

During all these months the real estate operators in New York and the other large cities of the United States had not been idle. To have a million families leave apartment life was serious; to have ten million wanting to leave as soon as air-homes could be provided for their use was a calamity that threatened their very existence. It is believed that had there been only one antagonist in the field, the Universal Air Corporation, in time the real estate owners would have won the battle by strictly legal means. But the airplane manufacturers were shrewd enough to look into the future, foresee the economic battle and prepare for it. They had as allies all the various syndicates that supplied the necessities of mankind. For example, one firm had the exclusive right to sell hosiery at the service stations. A lady wishing to purchase hose, handkerchiefs or lingerie could simply order an assortment sent directly to her air-home, select what she wished, return the rest and have the charge placed on her monthly bill. The food dealers were especially anxious for this business, and formed a powerful financial help in the approaching struggle.

Rents were lowered in the apartment sections of the city. An effort was made in some of them to introduce service that would compete with the service of the air-homes. The brightest minds of America tried to invent methods of living, whereby mankind would be induced to remain in houses, on the earth, and pay rent. Some measure of success was met

with, but more and more it was a losing battle, and it was easily seen that the only factor keeping the middle class on the ground was a lack of sufficient air-homes to house them in the air.

Meantime, millions and even billions of dollars were not paying a fraction of one percent on their investment in cement and structural steel. Only a small proportion of the apartments were vacated, but the lowering of rent necessary to fill them had practically taken away all the profits of the building. In many cases the rental income was hardly enough to pay for the taxes and janitor service. Men who owned ten million dollars worth of property often lacked the cash necessary to pay for the needed repairs.

It is no wonder that they became desperate.

The realtors' association held many secret and prolonged meetings. Every possible means of effectively coping with the situation was proposed, debated and in many instances tried. Nothing happened. At last they became desperate. Something had to be done and done at once. It was felt that any step of the future would be so serious that the secret of the details could not be made public. So a committee was appointed with unlimited power. They met and decided that they wanted to do something, but did not want to do it themselves or to know how, where, or by whom it was done. They had a fund of twenty-five million to draw on. They decided to employ one man.

They selected James E. Kidd.

He was a soldier of fortune. For twenty-five years his fighting brains

had been sold to any nation or group of individuals who wanted their fighting done for them. It did not make any difference to him which side he was on, what the fighting was about, or how many were going to be killed, so long as he received his pay regularly and his bonus at the end of a successful war. A dozen nations had money offered for him, dead or alive, but at the same time each of these nations would have gladly had him in its employ if, by doing so, it were able to deprive its enemies of his services. He had been wounded several times, once left for dead on the battlefield. He had made a dozen fortunes and lost twelve of them.

He had lost everything except his honor and his conscience.

He had been unable to lose these because he had never had them.

It was to this man that the secret committee of real estate dealers turned. They told him bluntly that they wanted something done to make life in the air unpopular. They were willing to pay the bill, but if he was detected they were not willing to assume any of the responsibility.

He was to be a financial hero if he was successful, but simply an unknown, unauthorized criminal if he failed. After telling him what they wanted done, they asked him for his methods of going after the results.

"I do not think I ought to tell you," he replied. "Anything that I am going to do that will produce the results you want will hardly meet with your approval. If you know in advance what my plans are, you will have guilty consciences; as it is now, you simply have a flattened bank account. Fortunately, you are paying me with

cash, and not in bills either, as they can be so easily marked. Gold is the thing. Twenty-dollar gold pieces, and even then I have a habit of going over them with a reading glass to see if they are okay. You just leave me alone; and, no matter what news you see in the papers, keep quiet."

That was the end of the conference. For the next week James K. Kidd investigated the affairs of the Universal Air Corporation. The result of that study showed him one thing. Every improvement in their business, every remarkable innovation, was the result of the suggestions of one man, and that man was Henry Cecil, confidential advisor to the President, Percival Provens. This remarkable fact being thoroughly established in the mind of Kidd, there was just one course of action, and that was the removal of the said Henry Cecil to a place where he could no longer advise.

That required another week of study. He wanted to learn the habits of this dreamer, where he worked, where he played and where he lived. This did not take long. The telephone directory gave him the location of Cecil's air home. He found out that all that was necessary to visit him at night was to ascend the circular escalator, step off at level fifty-seven, and go into his plane home *via* the plane platform and the door. After that, everything would be easy. In fact, he would not even have to go through the door; a well-directed shot through the window would remove the man to other spheres of usefulness.

It was Kidd's idea, that once Cecil was out of the way, the growth of the air-home project would slacken, enthusiasm would die out and the people

would be content to return to the earthly apartment houses. He seemed to be the only man who could really be called an originator of new and worth-while ideas. It seemed a shame to kill a man just because he was clever, but this man had become too clever. He was destroying property valuations. Kidd felt justified in removing him.

After the decision was arrived at, all that was necessary was to wait for a stormy night. Kidd wanted a period of thunder and lightning, an hour of noise and confusion, when everyone would be satisfied to stay in his air home and be thankful that it was made of material that was thoroughly insulated against the electricity of the air. He waited patiently for such a night and at last it came. He motored to the base of the air-service station, paid the taxi driver and carefully stepped on the ascending escalator. He had studied these movable steps and he knew that each level was carefully and thoroughly marked. At last he came to level fifty-seven and walked around to Side C. It was all as it should be. On a small brass plate was the name, "HENRY CECIL." There was an open doorway, and between the air-home and the doorway a rubber platform extended, with sides high enough to shut off a view of the ground and make the passage across perfectly safe from any danger.

Kidd had never been in an air-home. A day prior to the conference with the real-estate operators he had landed from a two-year engagement as the general of the army of a small South American revolution. But he had studied the plans of the air-homes and had been careful to perfect him-

self in every feature of them. The fact that the landing platform was out, made everything much easier for him; otherwise he would have had to crawl out over the service tube—no easy task, with the wind howling and the rain coming in blinding sheets.

The landing platform was out. In a period of sheer absent-mindedness, Cecil had forgotten to press the emptying button when he came into the plan that evening. His wife had entertained at bridge that afternoon and Cecil, always old-fashioned, had phoned her that he needed the exercise and would walk home. There was no need of her planing over for him.

He had been thinking of many things as he ascended the circular escalator and almost stepped off at level 57, Slide C automatically, as though in a dream. Arline, who was expecting him had pushed the button and filled the dilatable air platform so he could walk right into the air-home. He had done so, started at once to tell her about some of his new plans and forgot to press the button which would instantly empty the platform of its air and allow it to roll into a long cylindrical opening on the side of the plane.

They had their supper, and then, amid the golden glow of a summer sunset, the clouds had gathered and a thunder storm bore down on them. They liked it. It was the work of a few minutes to put the paper dishes and napery back in the food cylinder and sent it down the service tube. A button pressed allowed the collapsed table to enter the floor. Another button pressed brought up a love-seat for two, and on that love-seat Henry and Arline Cecil watched the storm.

They were happy. Life had been kind to them. Arline was contented, because her man was happy and Henry was happy because he was filled with the satisfaction that comes from the knowledge that he had been able to make millions of his fellow men happy. So, in the darkness, broken only by an occasional flash of lightning, they sat, contented with life.

When Kidd arrived on the landing platform, it was eleven and the storm was more intense than ever. There were no lights in the plane, but as he looked through the window glass he could see two heads above the back of the love-seat. It was hard to tell which was the man. He did not want to make a mistake and kill the woman. The only thing that he could do was to wait till one of them left the seat, and a flash of lightning told him which one that was. He drew his revolver; it was a weapon that had never failed him. He was not only an expert marksman, but he had spent long hours practicing shooting through glass. There was a trick in that; allowance had to be made for the refraction of light.

Once Arline, in a gesture, threw one arm above her head. At the same time a flash of sheet lightning showed the white arm and the diamond bracelet. That was enough. The head on the left was the man's. That was the one to shoot for—the next time the lightning gave sufficient light.

But for five minutes it was dark and in that five minutes Henry Cecil and his wife decided to retire for the night. Arline was a typical woman. She hated the idea of going to bed without locking up the house and put-

ting the cat out. There was no house and no cat, but in the plane home there was a landing platform. Night after night she asked the same question:

"Henry have you closed the landing platform?"

This night he had to admit that he had not. In the dark, thoroughly familiar with every square foot of the cabin floor and walls, he walked over to the control board and pressed the button. In a second's time the air was out, and the platform rolled up into the plane.

Arlene was nervous and cried, "I thought I heard a scream."

"Nonsense, my dear," said her dreamer husband, "that was just a gust of wind against the side of the plane."

The next morning Henry Cecil awoke earlier than usual. Dressing slowly, he finally sat down, put the ear-phones on and pressed the button for the morning news. The first and most startling feature of the audible newspaper was the fact that a man had been found dead at the base of the air-service station, rather well smashed up. He had evidently fallen from one of the air-homes during the night, but so far no one had been able to identify him.

"That is too bad," said Cecil to himself. "And one of our mottoes is *Safety First*. I will have to investigate it. Such calamities must be prevented in future."

But all the investigation failed to reveal just how this man had met his death, and, after spending the usual time at the Morgue, he was buried in a nameless grave in Potter's Field.

Meantime Cecil had been dreaming

some more. The sale of air-homes was satisfactory, the investment of the various service companies was entirely in keeping with the promises made when the concessions were granted. Everyone owning stock in Universal Air Corporation or its subsidiary companies was deriving handsome returns. Practically all of Cecil's dreams had materialized into practical money-making devices. But Cecil was not satisfied, and, after some days of dreaming without dictating, he asked the President for some hours of his time.

"Mr. Provens," he began, "the three mottoes of our concern are 'Service First, Safety First and Happiness First.' The success of the business has depended on our faithful adherence to these principles. I am frankly worried. The Air Corporation has risen high, but in doing so it has stepped on the toes of competitors. They are going behind financially, losing money. The money people have buildings that cost millions, and they are not doing as well as they used to.

"They had had to lower their rentals."

The President laughed:

"But that is what we were after."

"I know, but we have been too successful. We wanted some people to live in the air, but it is ending in almost everybody wanting to live there. Something has to be done about it. Now, my plan is this. Enlarge your corporation and make it bigger and better. Call it the Universal Housing Association. Pool all your interests and reissue stock. Offer to buy any New York real estate that is offered at a fair value and pay for it in stock of the new company. All apartment

houses that are over ten years old tear down and use the land for air-service stations. Those that are less than ten years of age convert into factories and office buildings. I think that the business of the nation could be done in New York if there were sufficient office space and homes. As far as that is concerned, a man could have his office in New York and live in an air-home anywhere he wanted to. There would be no trouble in renting offices, and I think that there would be a large demand for factory space if we could furnish quarters for the workers. There might be a number of the apartments that could be made into combined factories and homes for the factory workers and the rent given as part of the wages. All this can be worked out. It is simply a matter of detail. The important thing is that every time you give a property owner shares of stock, paying six per cent for his land and building which has been paying nothing, you make a friend and a new and active customer for your products. We cannot have too many friends or too many new occupants of air-homes."

"Every time you ask for a personal interview, Henry Cecil," exclaimed Percival Provens, "it means the expenditure of millions!"

"And it means the return of hundreds of millions in dividends. But I am not thinking of this in terms of

money, sir. I am thinking of it in terms of service, SERVICE FIRST, to the nation, to the men of the city, to the commonwealth. We owe them a service that is greater than the servicing of their cars and their homes. We want to make a service that will supply them with happy homes, adequate incomes, a comfortable assurance of support in old age. We started in to supply service air stations for air-homes. Why not go on and supply service stations for health, prosperity, comfort and happiness?"

"Is this a dream, Henry Cecil?" asked the President, smiling. He liked the man, the dreamer who sat at a desk in his private office and dictated his dreams to the wife.

"Yes, Mr. Provens. Call it a dream if you like, but go on and make it a reality. It will pay in the long run. A divided New York can never be a great New York. If you are able to get together all the housing under one company, then the sun will indeed shine on our city, the greatest in the world. Will it be all right for me to requisition an inflatable kiddycoop for my airhome?"

"Why, bless my soul, yes. But I didn't know you had use for one."

"We haven't at the present time, but you know the third motto,

"HAPPINESS FIRST."

The End

(Continued from page 59, DOCTOR MENTIROSO)

I leaped forward and grasped his hand and bade him a warm farewell. Then, suddenly remembering that I might be within his damnable fourth dimension limit, I sprang back and away from the black stone pedestal. The next moment the panel had been closed and he had disappeared within the machine. Recollecting my former experience, I hurried away from the machine, but before I had taken ten steps, I was swept from my feet by the rush of air I had felt before. Glancing about as best I might, I saw that the machine with Doctor Mentiroso had vanished.

Despite the fact that I was not to await his return, I felt compelled to remain within the court, and torn

by a thousand conflicting emotions, I maintained my lonely vigil throughout the night. Indeed, for weeks I visited the place daily, each time hoping against hope that the strange machine would once more gladden my eyes as it rested upon its pedestal. But *Don Fenomeno* has not returned.

But still, though my common sense tells me he has gone forever, I cannot rid myself of the conviction that some day my Peruvian friend will sweep down triumphantly from his journey through space. But perhaps, he really returned twenty-seven years ago. To this day, I do not know whether he was serious or merely joking, when he spoke of returning in the year 1899

The End

(Continued from page 109, THE GOSTOK AND THE DOSHES)

the building behind and above me. With my eyes shut, it did seem downwards. I walked for a long time before opening them. Then I opened them and looked around.

I was at the end of the avenue of poplars. I was surprised. The avenue seemed short. Somehow it had become shortened; I had not expected to reach the end so soon. And where were the guards in olive uniform? There were none.

I turned around and looked back. The slope extended on backwards above me. Indeed I had walked downwards. There were no guards, and the fresh, new building was on the hill behind me.

Wolshensky stood on the steps.

And a new building, modern! Vibens' office was in an old, Victorian building. What was there in common between Vibens and Wolshensky? I drew a deep breath. The comforting realization spread gratefully over me that I was back in my native dimension. The gostak and the war were

somewhere else. Here were peace and the war were somewhere else. Here were peace and Wolshensky.

I hastened to pour out the story to him.

"What does it all mean?" I asked when I was through. "Somehow—vaguely—it seems that it ought to mean something."

"Perhaps," he said in his kind, sage way, "we really exist in four dimensions. A part of us and our world that we cannot see and are not conscious of, projects on into another dimension; just like the front edges of the books in the bookcase, turned away from us. You know that the section of a conic cut by the y plane looks different than the section of the same conic by the z plane? Perhaps what you saw was our own world and our own selves, intersected by a different set of coordinates. *Relativity*, as I told you in the beginning."

The End

(Continued from page 79, THE MAN FROM THE MOON)

ants. Time, however, should raise up a man among them, who will have the intelligence and the persistence necessary to decipher it. I picture him, however, as a studious man of religion, and therefore uninterested in its scientific aspects—and my scientific mind yearns to communicate with others of its kind—minds that will understand.

To my descendant, I therefore give this charge:

Translate this writing into the languages of the leading nations of Earth. Then journey hence, to a place where you will find a pit three-quarters of a mile in width and more than five hundred and fifty feet deep. It will be ringed about by a wall a hundred and fifty feet in height. My figures are approximate because they are only calculations, based on the size and speed of the meteoric mass which Mars projected to Earth.

Because it is unique on Earth, and exactly resembles the pits on my native planet, men of science who are interested in Magong will eventually

visit it. When you have found it, you will secret yourself in the neighborhood and observe these men. Each time you see a true scientific visitor, watch the face of Magong for a sign. When a bright light appears, you will know that my soul has recognized the right person, and signaled you from its celestial abode.

Hand him a translation of this writing in his own language, and go about your own affairs with my blessing, for it is to him and to his kind that I, as a scientist, address this message.

And now, as I bring this my life story to a close, I look back over a long, and fairly happy existence spent on Earth, yet each time I view Magong, I cannot help thinking of what might have been, had it not been for that horrible, man-made plague called war. Nor can I repress a feeling of sadness at sight of my once proud world among worlds, now a lowly satellite, her war-scarred, lifeless face forever turned sadly and submissively toward her new master, Earth.

The End

(Continued from page 95, BEYOND THE PLANETOIDS)

sand pieces and sent them hurtling soundlessly into the depths of the Void.

"I never thought it would take him that long to hit that polarized motor," remarked Sidler pessimistically. "He must have set off ten million volts at least in ray bombardment."

The others remained silent, awed by the masses of steel with their serrated edges gleaming sharply in the sunlight that came hurtling past them. The body of a man, spinning rapidly, shot past. Basil wondered fleetingly how many hundreds and thousands of years it would continue to spin on its long, long journey through the Void. Then he called the roll.

All the men answered and drew together, seven human motes floating in the tremendous infinity of eternal space. Only the distant sun, like a yellow arc light millions of miles away, and the nearer glowing mass of Jupiter stood out strongly against the canopy and bottomless abyss of everlasting

stars. Basil pointed at a large glowing planet.

"There is Callisto, one of the great moons of Jupiter," he said in his speaking disc. "As I told you when I explained this plan, these suits are the most modern I've ever seen—even to propulsion rays. They are almost space ships in themselves. Callisto there is but a few hundred thousand miles away. With the speed these suits ought to develop, we can make it and the gravity plates will permit us to make a landing. I know it is unbelievable that men can deliberately leave a ship in space, aided and protected merely by space suits, and make such a journey as this. But, men, I'm telling you we can do it! Come on; let's get going!"

Obediently they clasped hands and floated away with gathering speed for a happy landing on Jupiter's fourth satellite.

The End



